TECHNOLOGY DEPT.

Gas Journal

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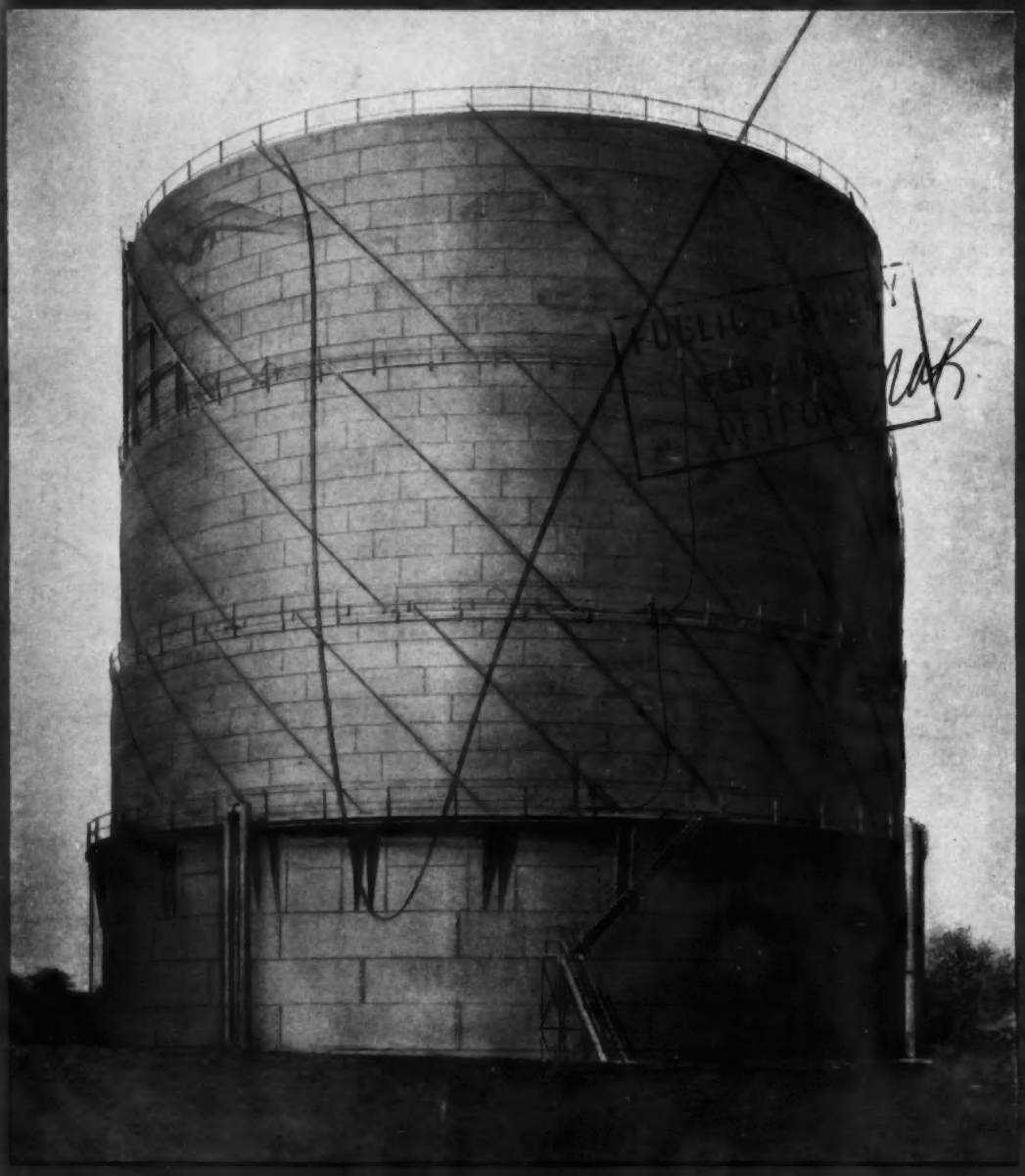

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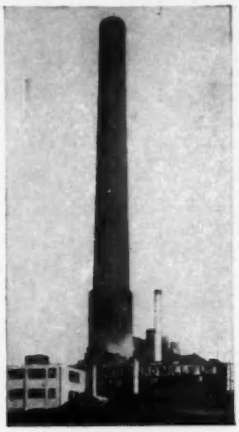
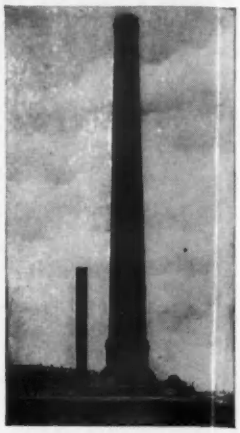
Left : Trial borings for reconstruction of Coventry Cathedral.





Two of the largest chimneys in the British Isles; on foundations of Francois Concrete Piles (left) and Francois Cementation Piles (Right)

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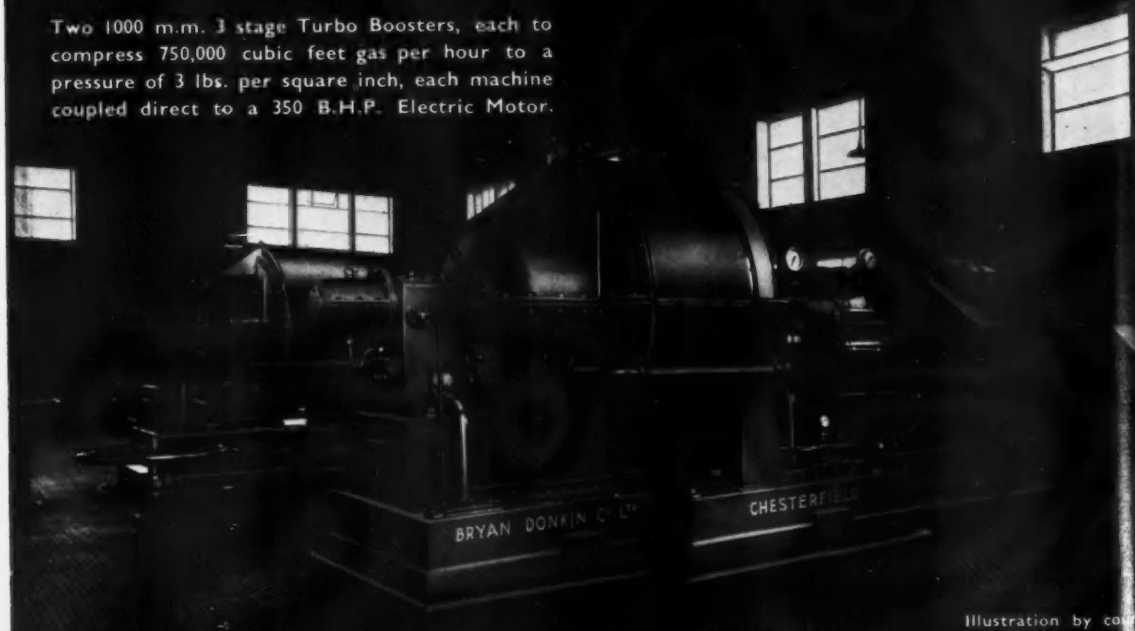

Illustration by courtesy Scottish Gas Board

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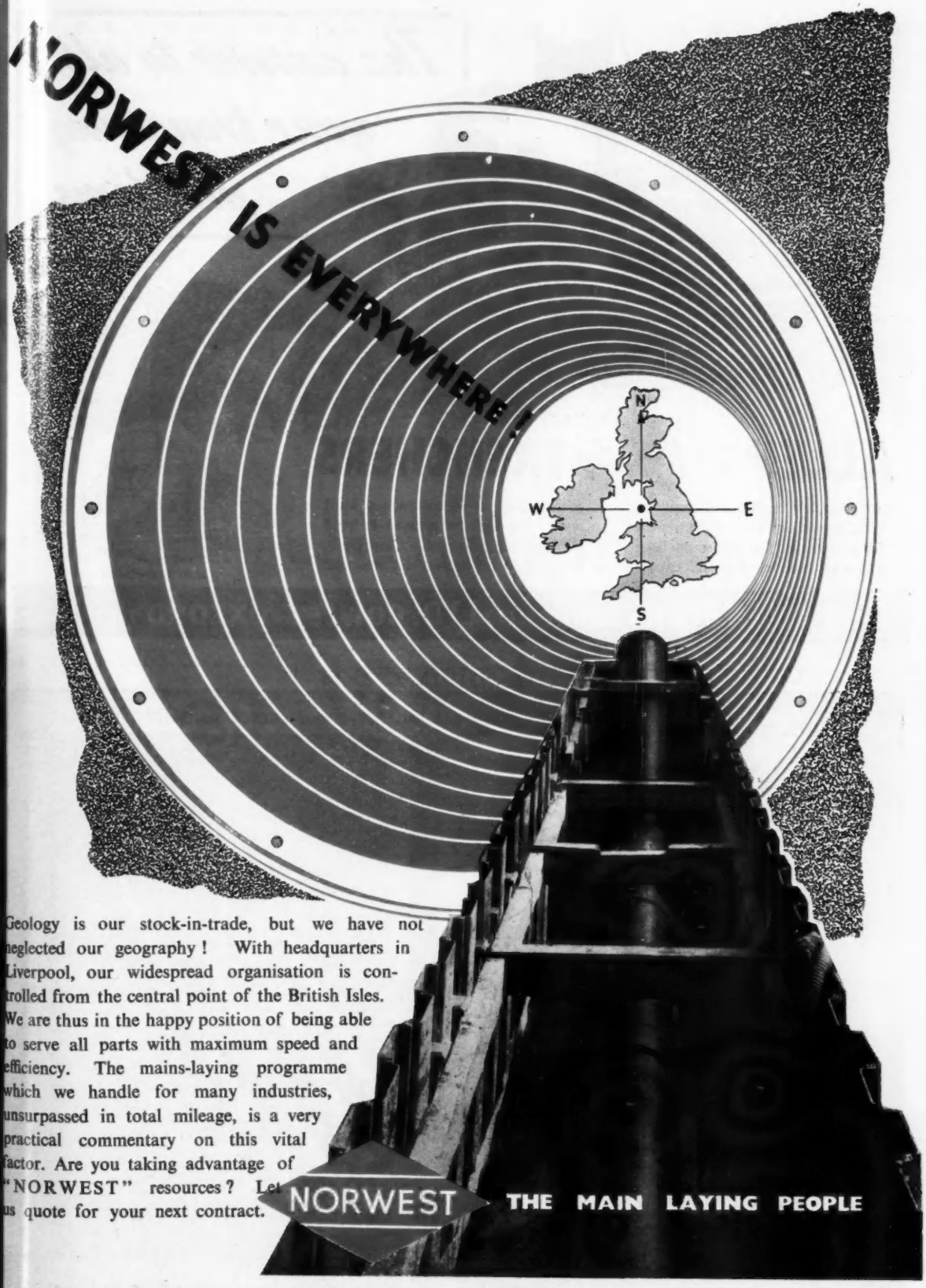

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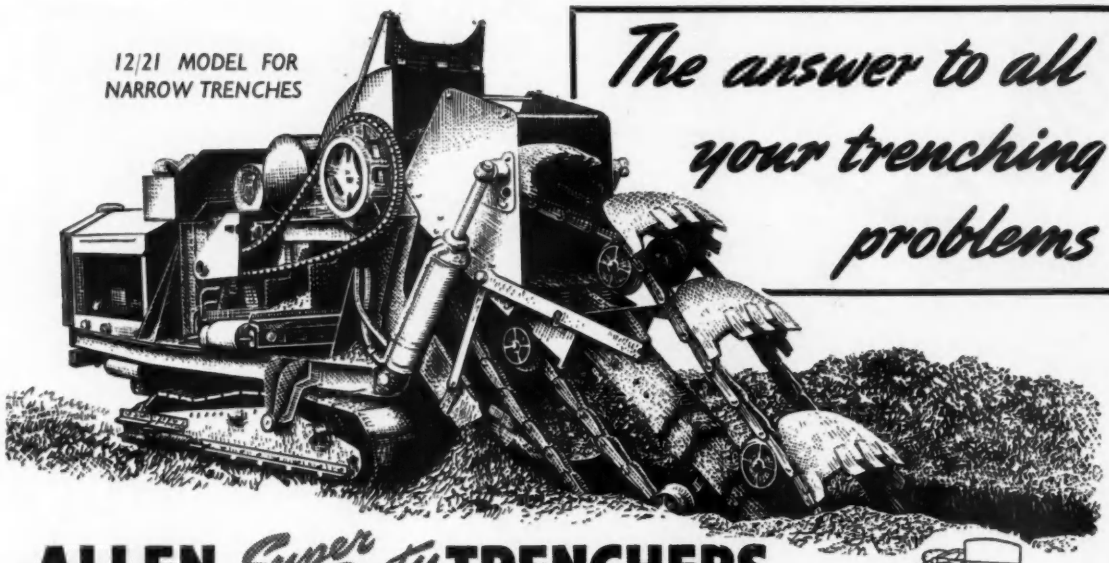

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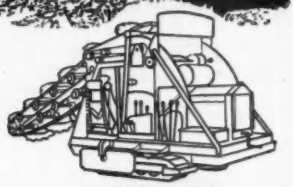

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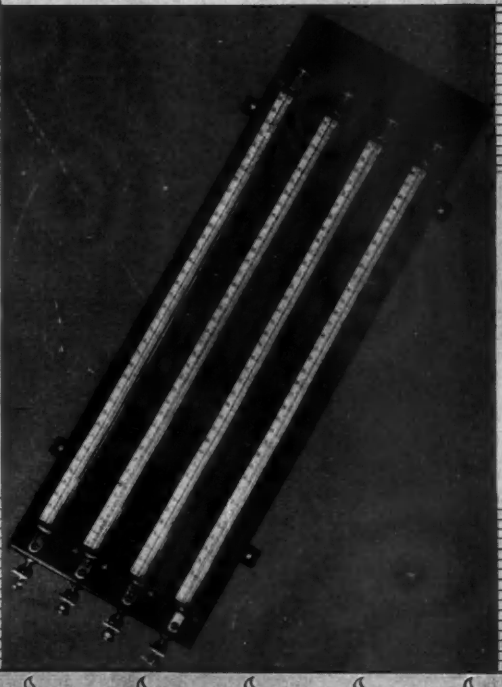

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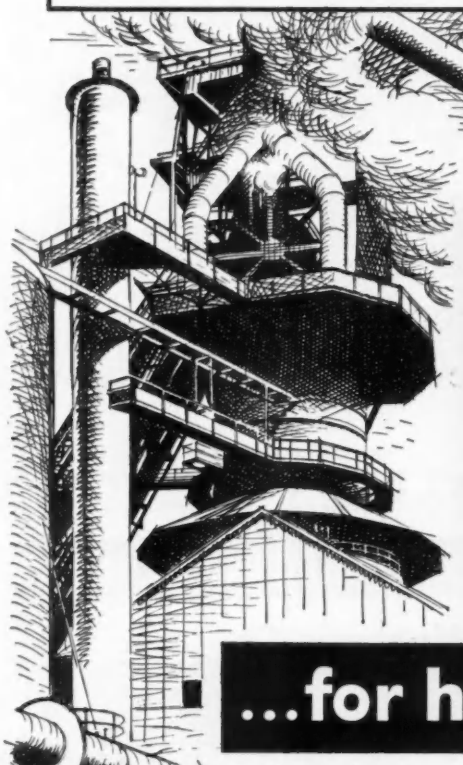
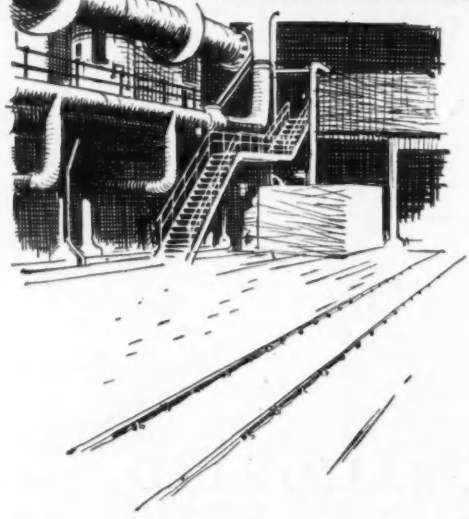
Silvertown CONVEYOR BELTING



...for hot coke



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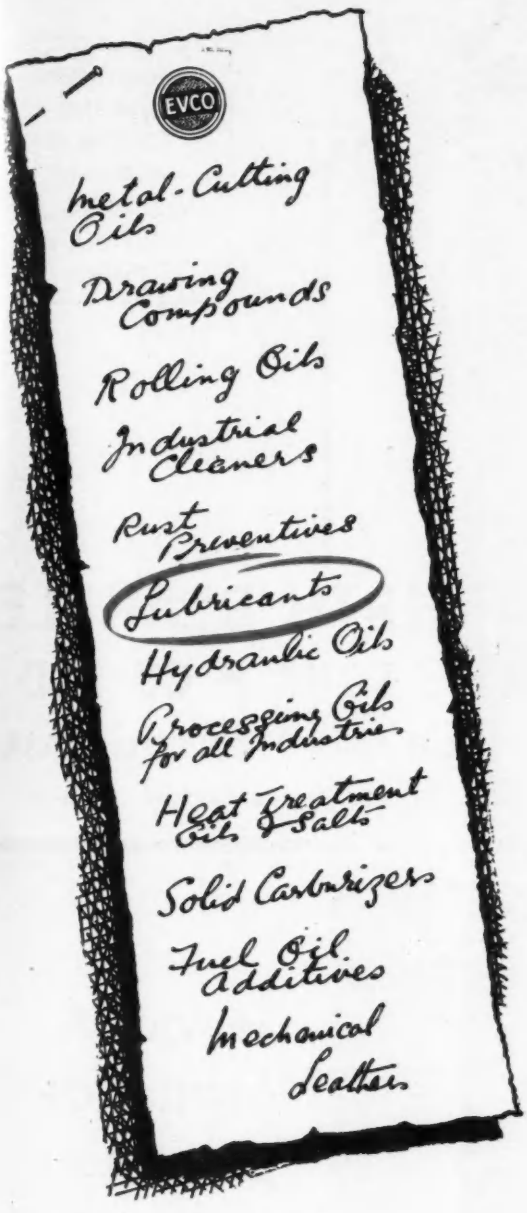

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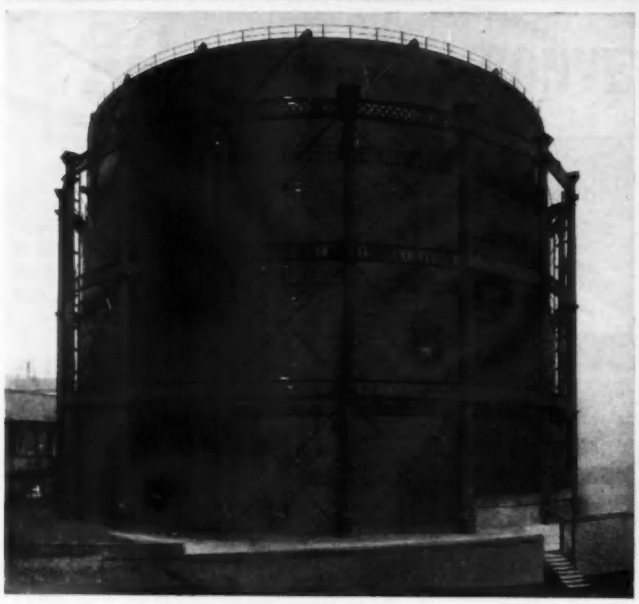

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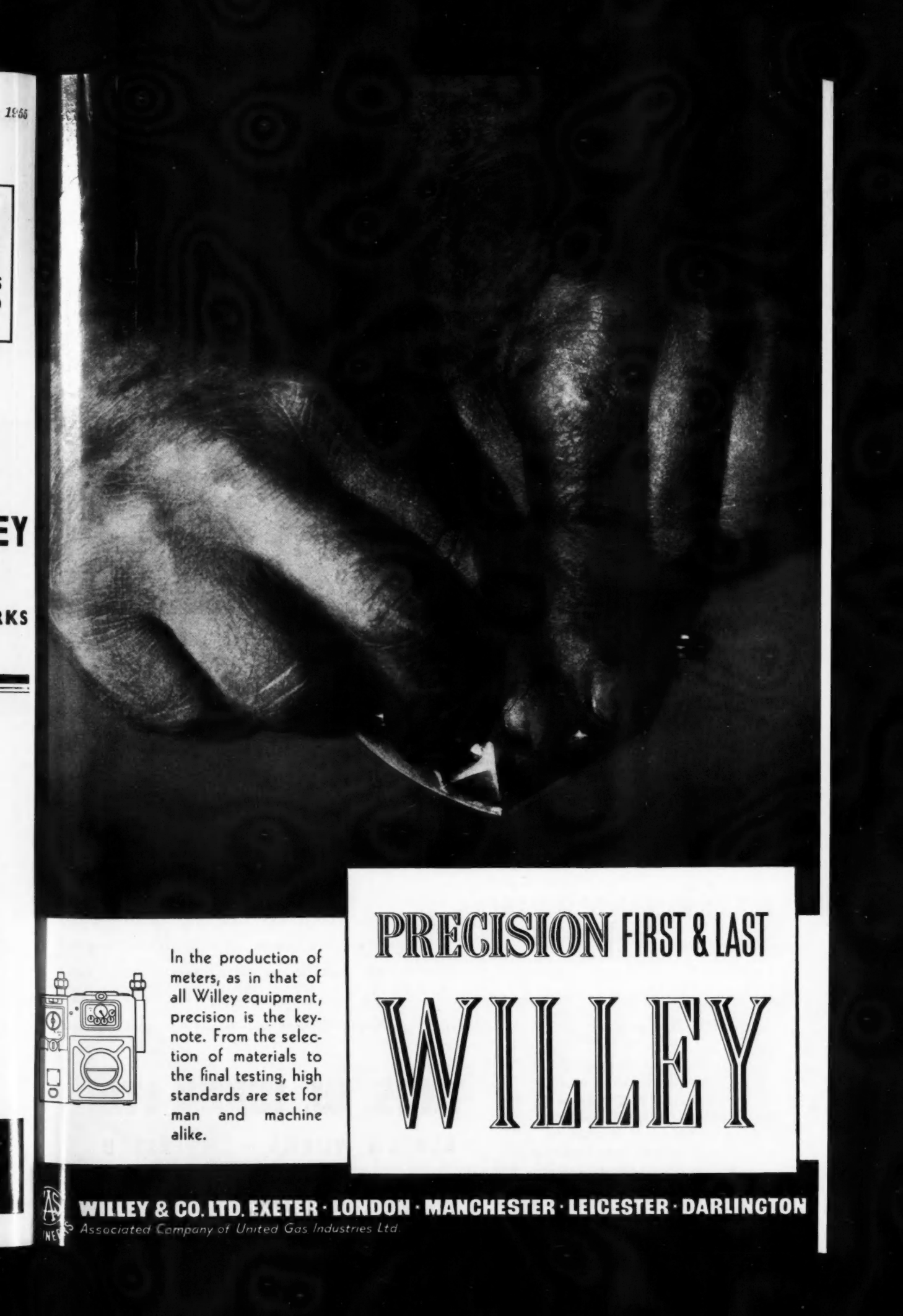
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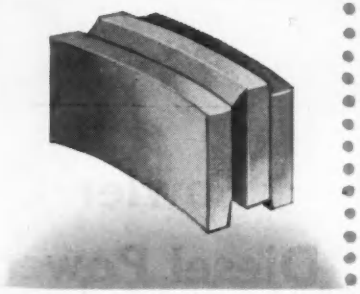

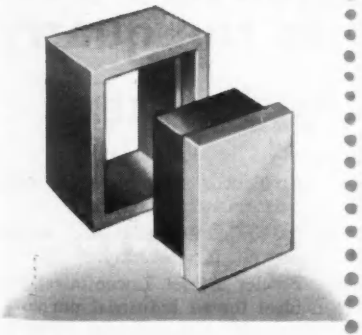

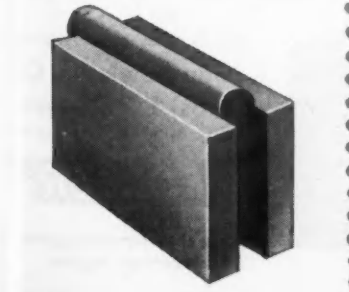

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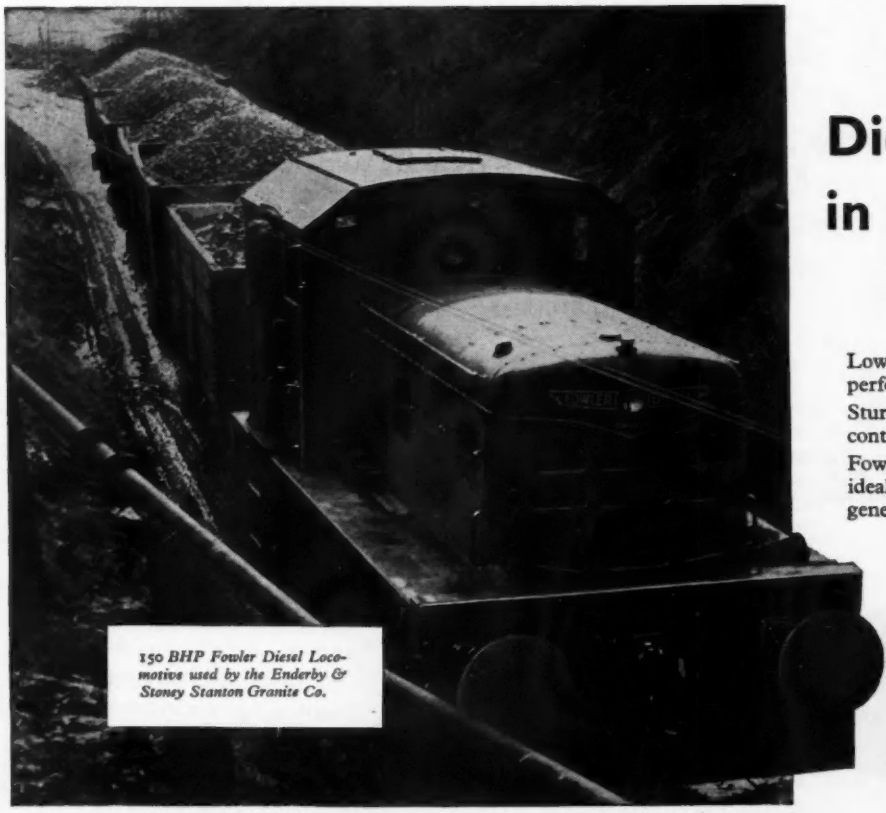

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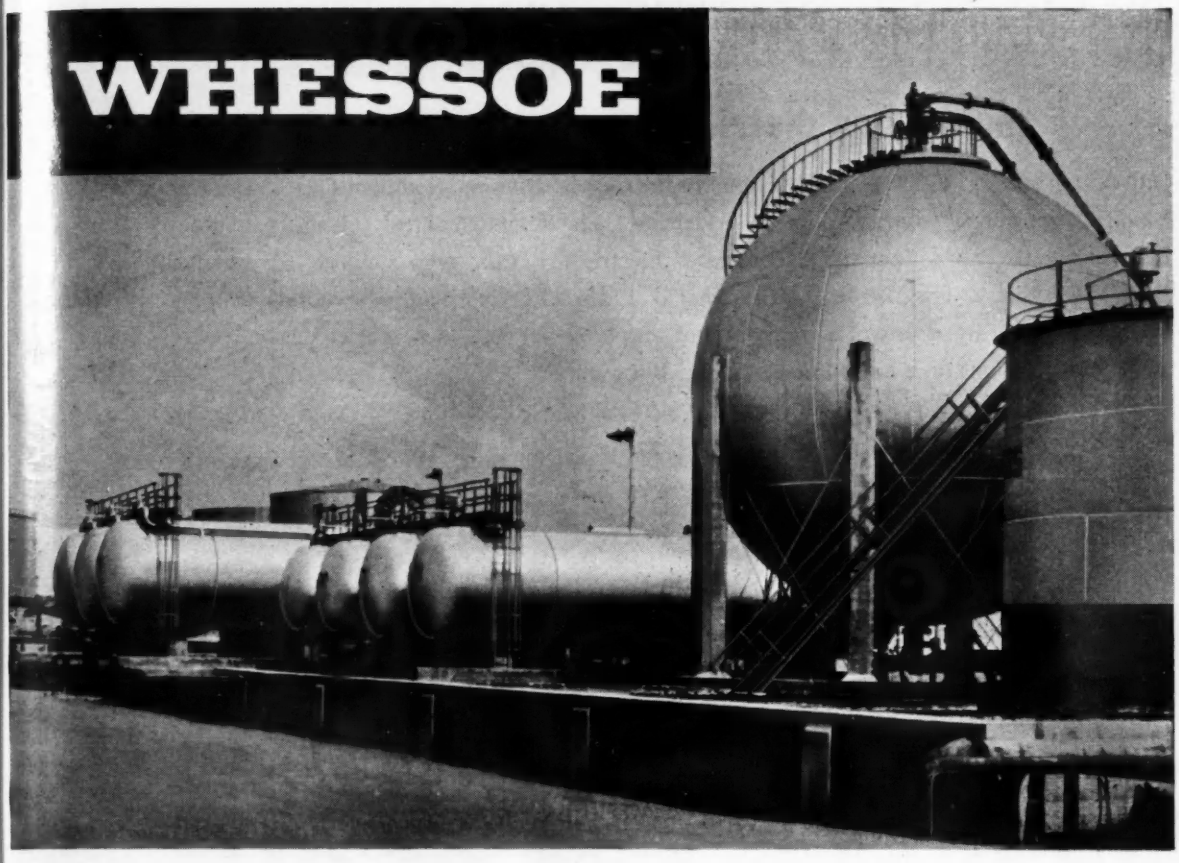

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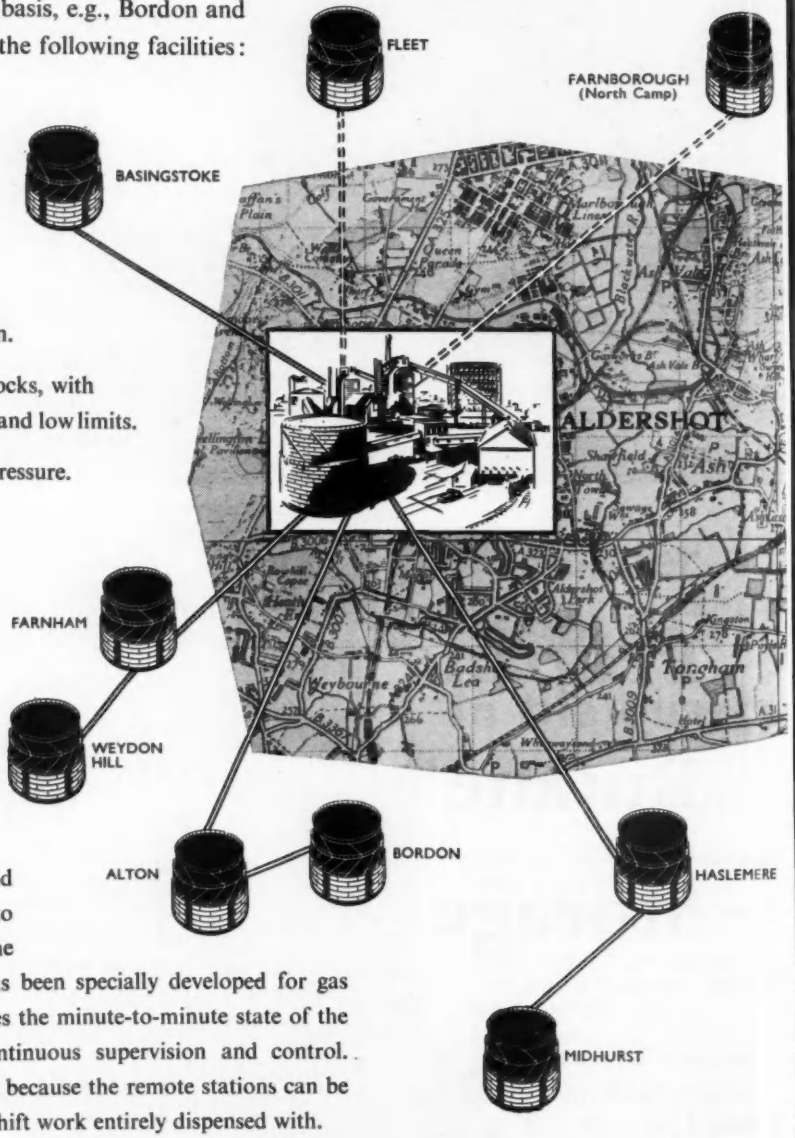

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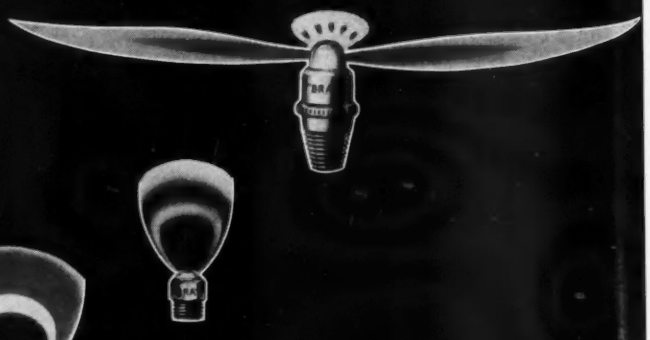

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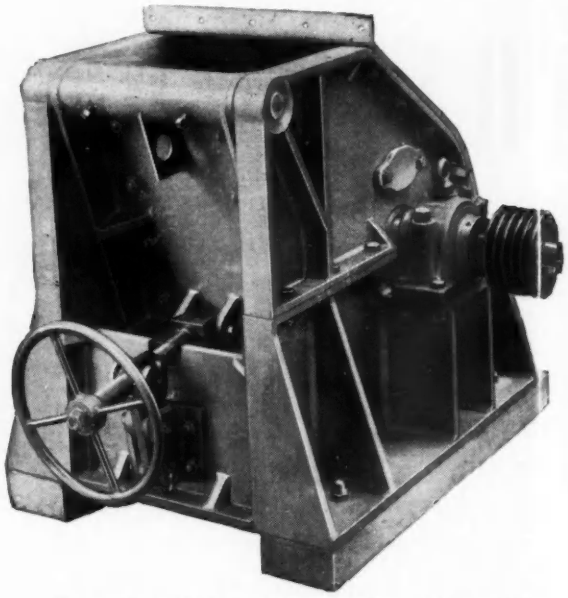

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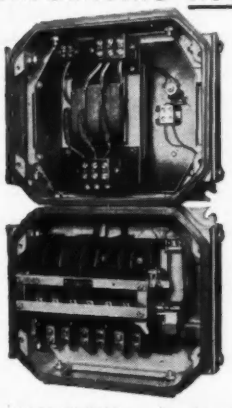

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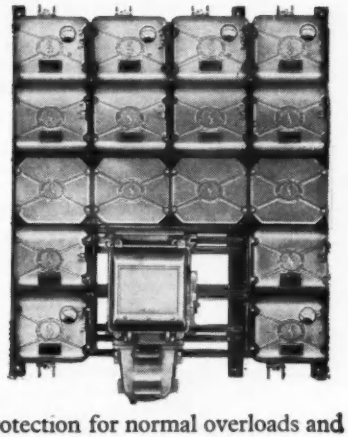

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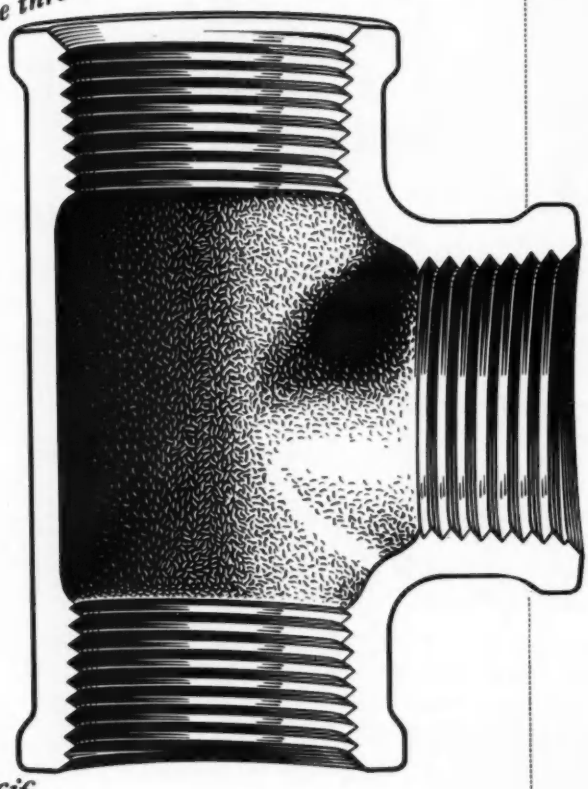

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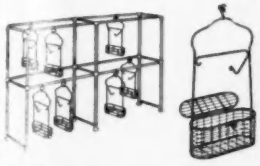

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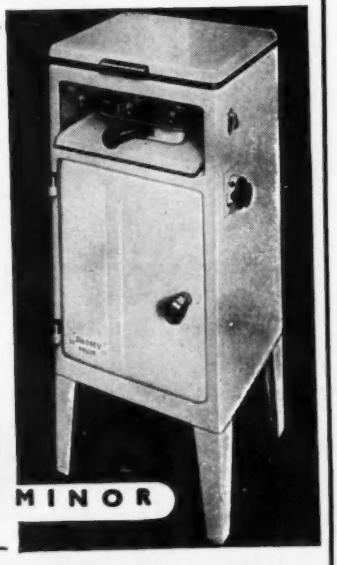

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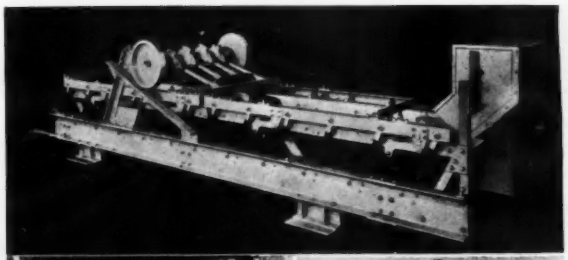

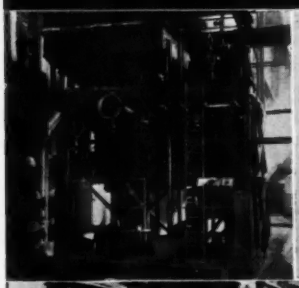

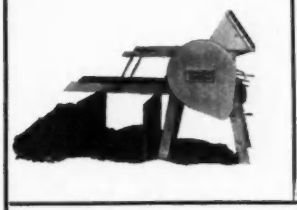

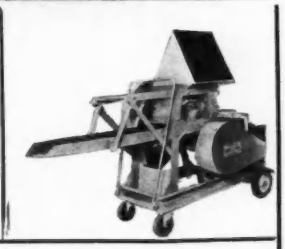

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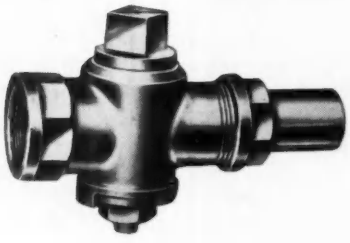

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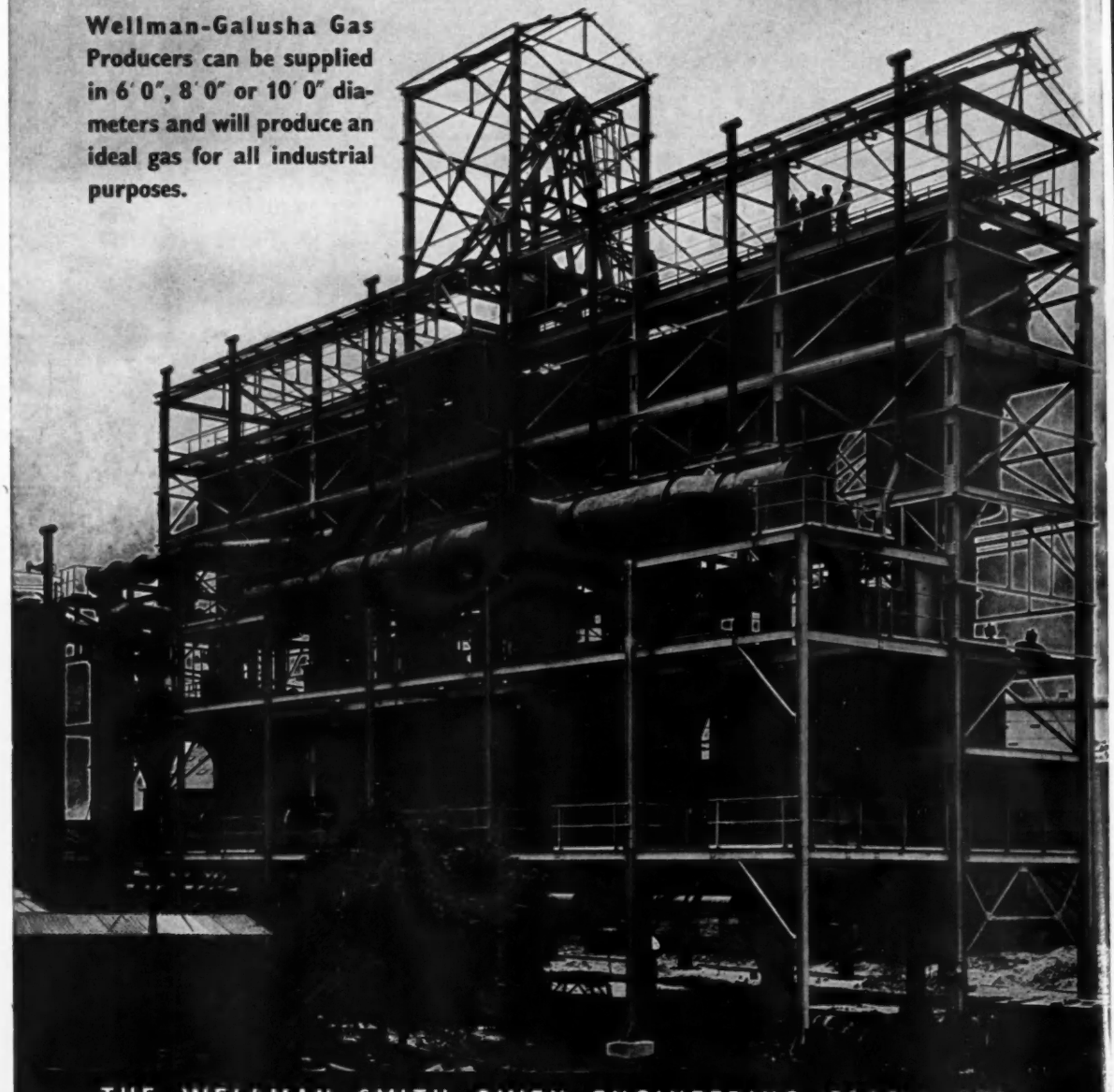

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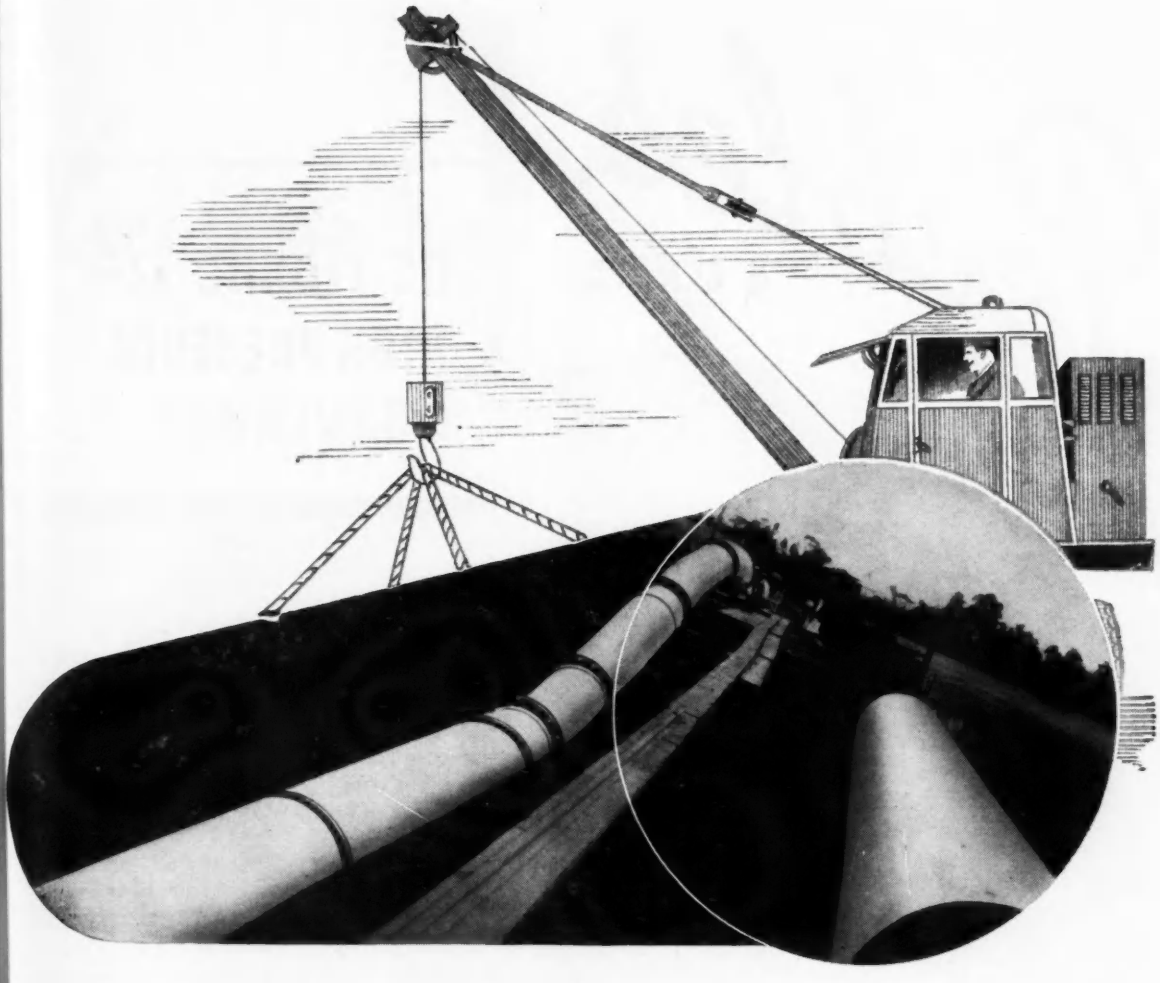

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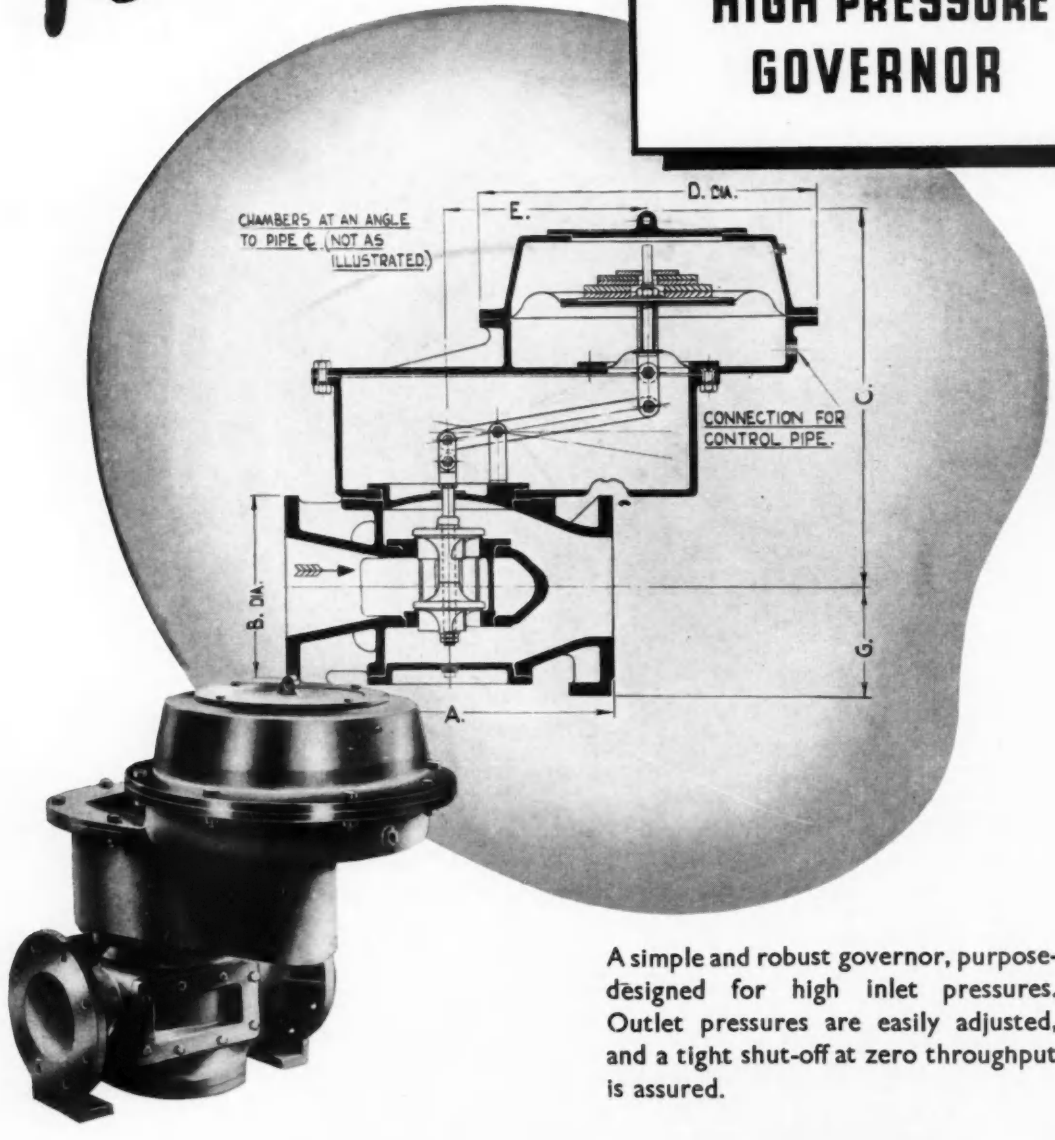

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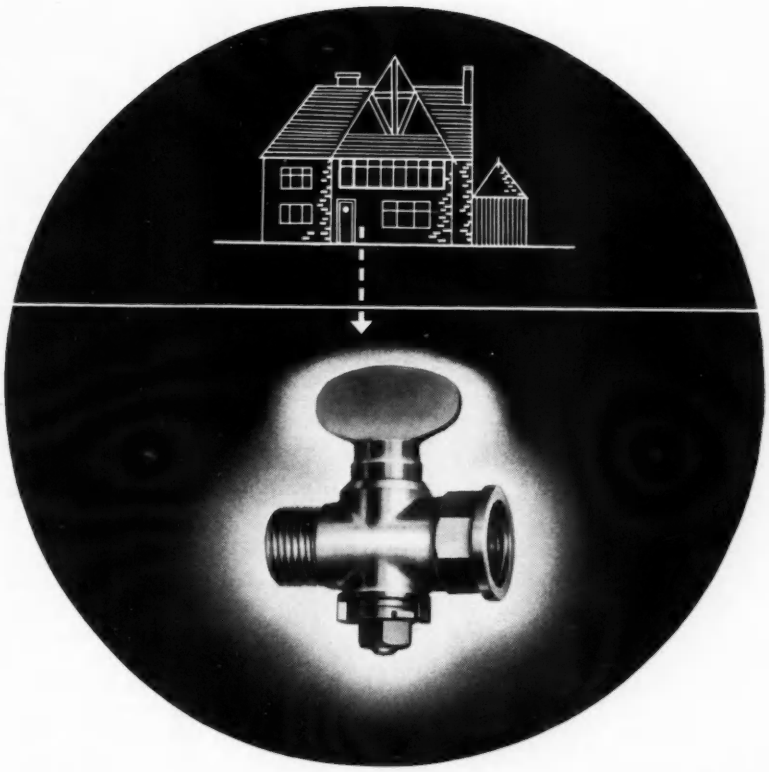

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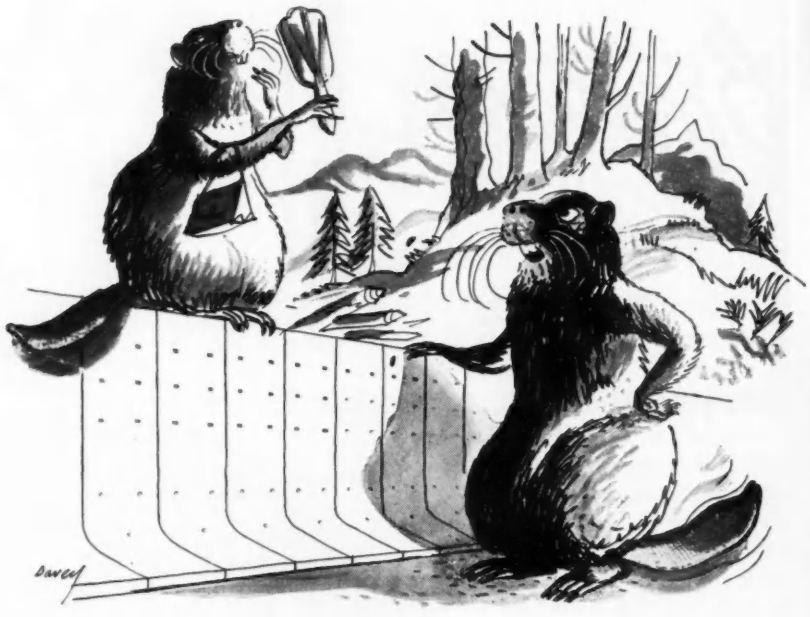
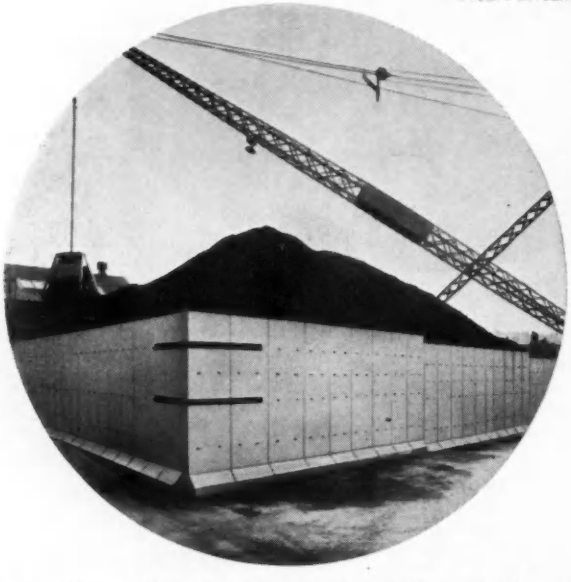


"The beaver is noted," says the reference book; "for great intelligence, glossy fur and its skill in building dams." Beavers and businessmen both have storage problems on their hands. Industrialists who work like beavers are noted for their great intelligence and skill in using Stelcon units. The female industrialist has the glossy fur – usually mink!



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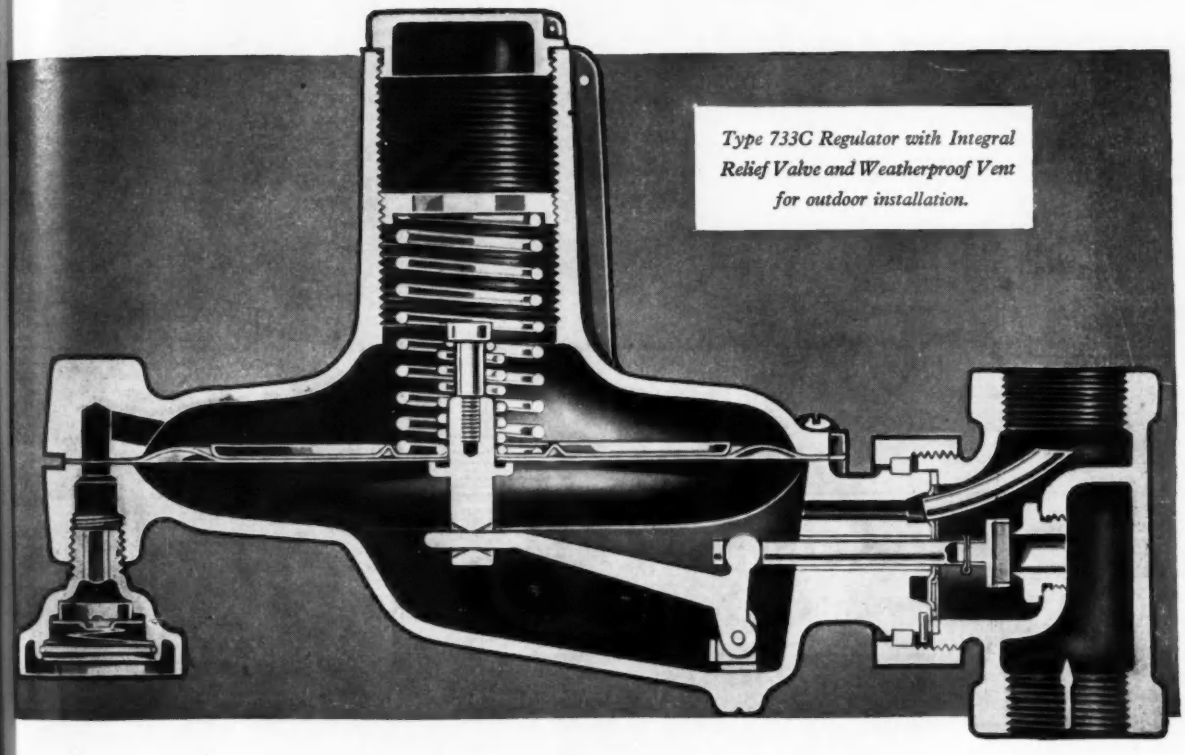

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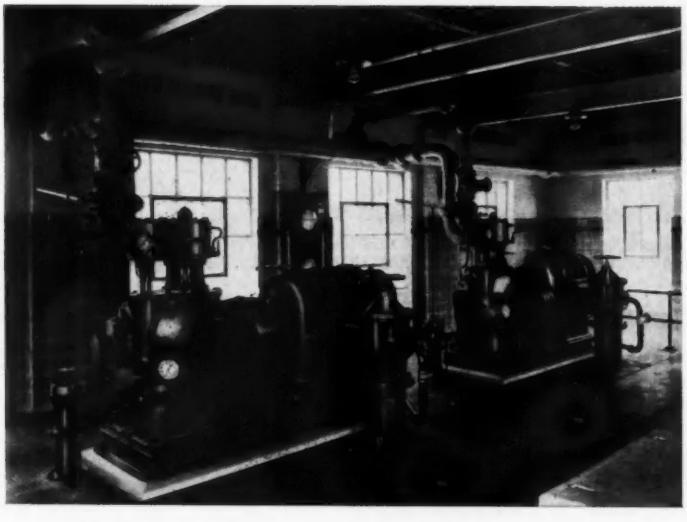

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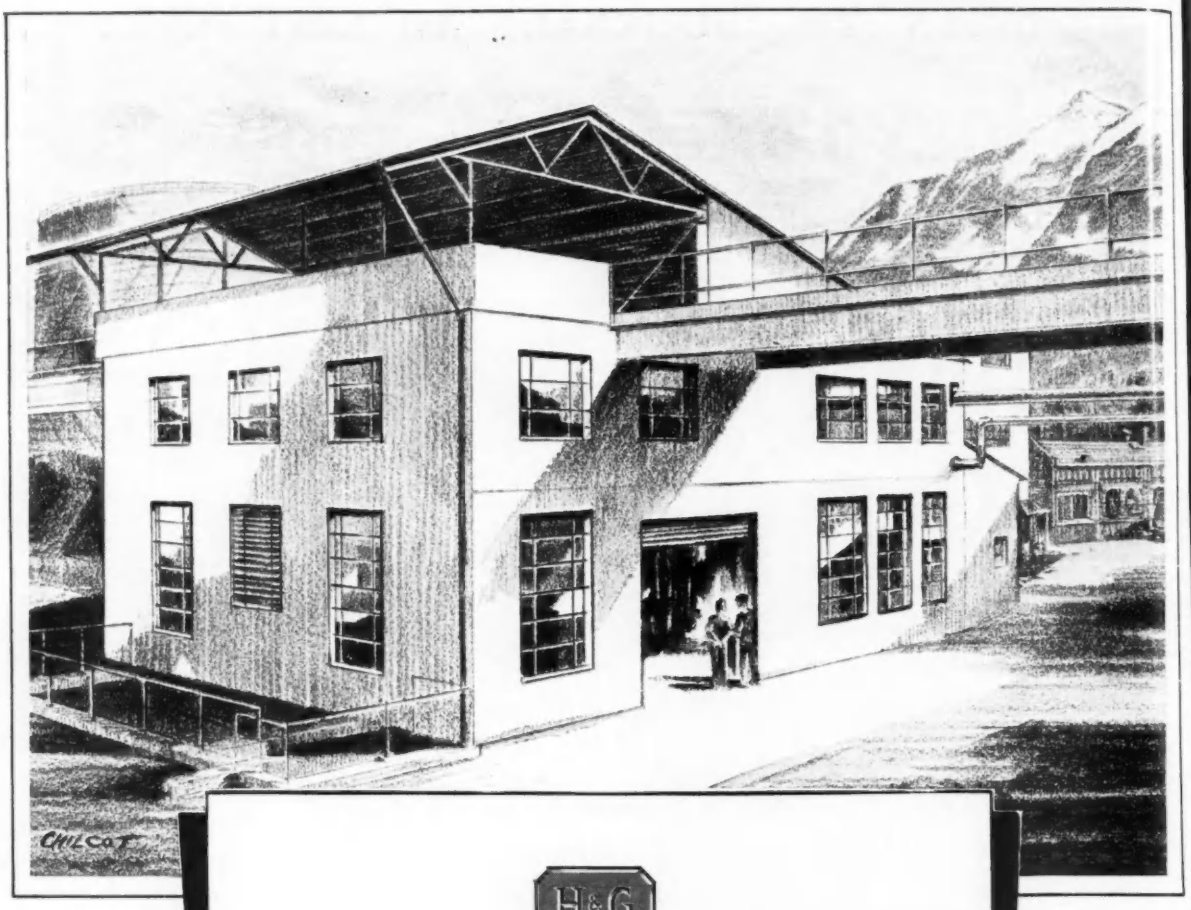

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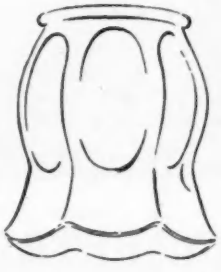

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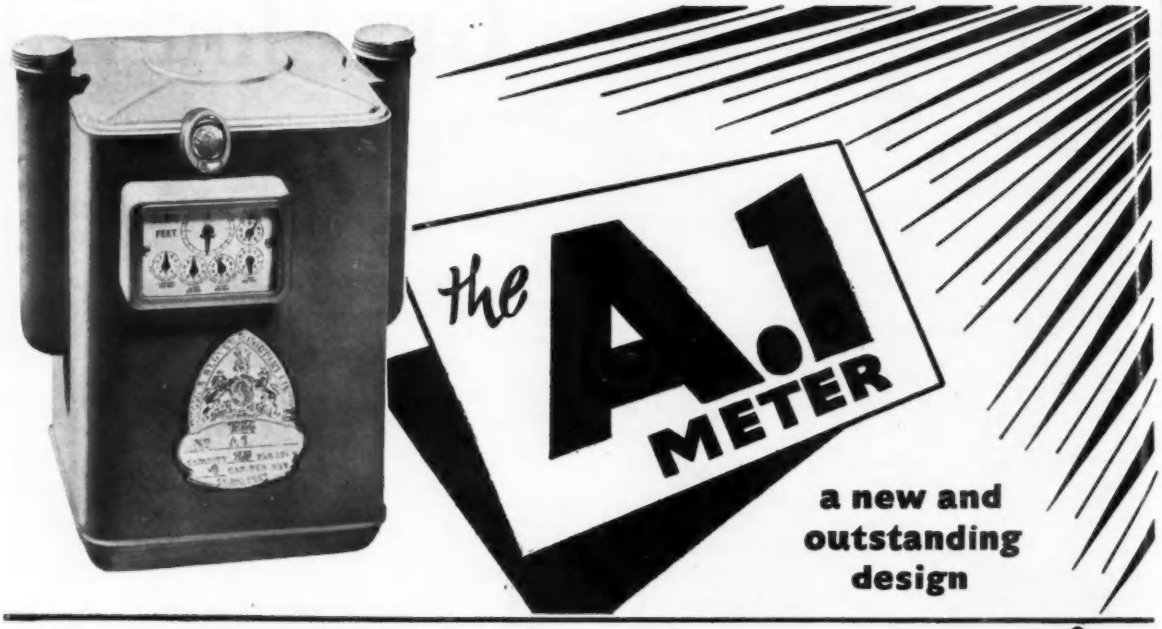

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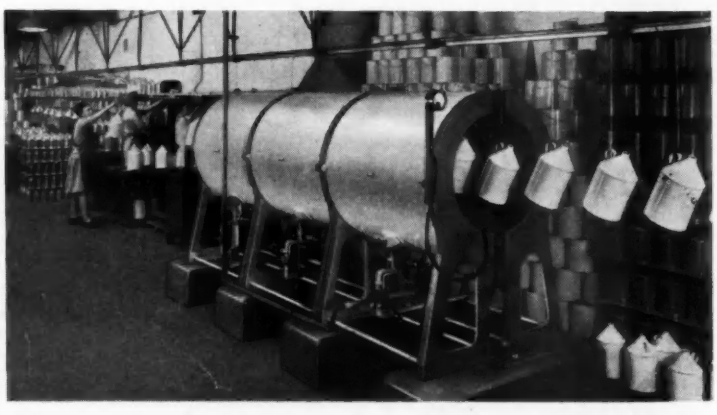

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Gas Journal

VOLUME 281. No. 4784. FEBRUARY 9, 1955. 107th YEAR

Clean Air—the Decision

SINCE we last commented on this vital subject, February 4 has come and gone and the fate of Mr. Nabarro's Clean Air Bill has been decided. As everybody now knows, the Bill was withdrawn by its author in view of the Government's promise that it will introduce, this Session, a comprehensive Bill of its own to follow the recommendations of the Beaver Report.

The debate which took place in the House of Commons when the Clean Air Bill was put up for its second reading was, by common consent, one of the best for a very long time. Many points of view were put forward, but it is clear that the great majority of the Members, on both sides, were whole-heartedly in favour of clean air legislation at a very early date. Among the dissentients, some felt that enough emphasis had not been placed on pollution by sulphur dioxide, another that there might be difficulty in administering the law in regard to penalties for making smoke—these were, however, lone voices drowned in a roar of acclamation for the Bill and its author.

It is not surprising that the Government should have bowed to the clearly expressed will of the people and the House by promising to bring in legislation this Session. For the record it is worth quoting from the statement of the Minister of Housing and Local Government on the subject. Referring to the Government's plans in this matter he said:—

'As soon as the consultations to which I have referred are completed, the Government will frame and introduce a comprehensive Measure, including the financial provisions needed to make it effective. The Bill will follow the general lines of the recommendations of the Beaver Committee. I say " general lines," because I want to make it clear that that does not preclude us from considering other additional, or alternative, proposals such as have been put forward by various Hon. Members during the course of this debate.

'I can make no promise—and the House will not expect me to do so—about the date of the introduction of the Bill, except that there will be no avoidable delay and it will, of course, be introduced during the present Session. Whether the Bill will get through all the stages this Session will largely depend on how far it proves to be an agreed Measure. But, judging from the speeches to which we have listened today, there seems to be a very good prospect that Hon. Members in all parts of the House will do their best to facilitate its passage.'

So ' the shouting and the tumult die ' with the withdrawal of Mr. Nabarro's Bill and the relegation of legislation to a later stage in the Session. The name of the energetic Member for Kidderminster will probably cease to be such a household word, at least until he considers the time ripe for a little more crusading! Before he recedes into a relative obscurity, we would emphasize again the great benefit which he has conferred on the nation by his public-spirited action in introducing the Clean Air Bill. It may be that some similar legislation would have found its way on to the Statute Book in time, but it would probably have been a very long time rather than a short one. Truly, the moment taken was just right. The combination of circumstances—the great London Smog of 1952, the Beaver Report which followed it, Mr. Nabarro's luck in the draw for a Private Member's Bill, his particular interest in fuel technology and the abolition of air pollution, even the recent short blackout of London by smoke a few Sundays ago—all these combined to supply the irresistible pressure which has brought about the long-desired end.

The country's thanks are also due to Sir Hugh Beaver and his Committee for submitting such a comprehensive and sound Report, and one which provides a most adequate foundation for any future legislation. A special mention should also be made of the extremely valuable personal contribution to the Report of Dr. G. E. Foxwell, who, in his Appendix XI, deals with the provision of smokeless fuels. As we happen to know from personal experience, Dr. Foxwell has given unstintingly of his time and energies in the work of the Beaver Committee, especially in his assessment of the means by which the requisite smokeless fuels may be obtained.

We would add one last word. In the nature of things, the Clean Air Bill ceases to be news for the present and the nation, Parliament and Press turn their attention to other and equally pressing matters. But, for the gas industry, the period from now until the Government's legislation is introduced is a heaven-sent breathing space presenting, as it does, an opportunity for it to get its ideas sorted out and its plans made. By the time the Bill makes its next and final appearance, the gas industry should have clarified its position in regard to the supply of the gas and reactive

coke which are going to be required in a smokeless Britain. Now is the time and the opportunity, and the industry must not fail the nation.

High Repute

WITHOUT question the Gas Council publicity team know how to 'put a thing over'; and, speaking from our own experience, the same applies to the majority of the Area Boards. Time was when the big-hearted and more enlightened company undertaking might have escaped the slings and arrows of carping journalism and grousing public, but in general 'the gas' was anybody's Aunt Sally. In the last few years we sense a distinct difference. Gas now can be said to have a very good 'press' and consumers will flock to see and learn.

To some extent this may be due to the public having more to spend; it is not, we think, due to nationalisation, *ipso facto*, for the minds of the majority remain unchanged by the fact that gas, its profits or losses, are theirs. The growing approbation throughout the country, from Manchester to Brighton, Westminster to Swansea, is mostly due to expert publicity and knowledgeable public relations work.

Last week saw staged two shows which must redound to the credit of the industry and the popularity of Mr. Therm and his first cousin Mr. 'S. S.' Therm. The first was the showing of 'Guilty Chimneys', the latest Gas Council film, in a committee room at Westminster Hall. The occasion was sought by Mr. Gerald Nabarro to precede the second reading of his Bill, on which we report in other columns; and as many as 60 Members of Parliament came to learn some cogently presented facts and to vote the film a first-rate contribution to public welfare. They had, too, a very fair insight into the cohesiveness of the gas industry, in that they met that evening no fewer than 12 of the 14 members of the Gas Council. They found, incidentally, that while Sir Harold Smith was ready to answer any question about gas or coke, he was not minded to deplore (officially) the fumes wafted from barges across the terrace of the House, or to confirm a Member's suspicion that 80% of the heat fed to a locomotive boiler goes up the smokestack. Mr. Alfred Robens, popular with all and, we like to think, less 'political' than many, was there to hand a bouquet to the industry.

The other occasion which prompted the opening remarks of this article was the first night of a show which this year is going to draw the public in thousands. To the North Thames Gas Board fell the arduous duties of producer and stage manager of 'Kitchen Magic', by Bon Viveur—a partnership familiar to perhaps millions from articles in the press and from their books, but now to be introduced personally by the Area Boards to the broad circle of their customers. An account of this most festive occasion appears in later pages of this issue, but we made special note of the fact that invitations went out through the various Women's Organizations (and many came to Southend from the other side of the county) and through handbills inviting consumers to the local showrooms. The house was soon 'sold', and upwards of 2,000 packed the Kursaal.

Publicity on such a scale doesn't just happen and 'come off all right'; it needs immense thought and organization down to the smallest detail—what if the grill lighted back when Phyllis Craddock put the match to it! And so we respectfully take off our hat to the whole team who did it—from Commercial Manager S. G. Aberdein to District Manager A. A. Hall and Sales Supervisor H. G. Tucker.

Art in Industry

TIME was when almost the only patron of the arts was the Church which, in turn, was succeeded by the rich, cultivated individual, whose patronage, roughly speaking, lasted as long as his money. So far no one has taken his place. Hopes that the rôle might be taken over by the State have not materialized and today, the artist, who exists in larger numbers than ever before, faces a future in which he is denied the support of a patron who gives him a definite line on which to work. Consequently his art becomes functional, while still forbearing to interfere with his artistic conscience. Into this cheerless prospect has come one beam of light. It comes from private enterprise in the shape of the Shell Petroleum Co., Ltd., whose profits appear to be such that they can afford to stretch out a friendly hand to culture. The result of this encouragement was an exhibition recently at the R.W.S. Galleries in Conduit Street, London, W.1, entitled 'The Artist's View of an Industry.'

Its preparation began when a considerable number of painters of talent, but not yet established, were invited by Shell to submit pictures with the oil industry for subject. This was done because the Company felt that many aspects of its work could best be illustrated in such a way. The artists were free to choose any aspect whatsoever and to deal with it in any style. They were taken to refineries, installations, research centres or to any of the other scenes of the oil industry they preferred. They were not asked to do a job of advertising or, for that matter, a pictorial exercise in public relations. Their artistic conscience was in no danger—from the outside, at any rate.

Every picture in this exhibition was purchased by Shell. The sponsors admit that such a venture is not without prestige value, but the real point of this exhibition is that Shell has started something which can lead to much that is good for the world of art; and it is a heartening sign that such a great international industrial concern should be enlightened enough to take the lead.

There remains the question of the success of the experiment. In other words, was the quality of the pictures produced in this way sufficient justification for the scheme? This is a difficult question to answer because this is a technical journal and not an art magazine. But despite the fact that newspaper reviews were on the whole laudatory (concentrating mainly on the small minority of wholly successful exhibits and obviously anxious to praise the basic idea of the project), we know that we have the support of at least one school of informed opinion in describing the exhibition as a little disappointing. The fault, if fault there is must lie with the distinguished panel responsible for nominating the British artists, although it might perhaps be argued that it is better that promise should not be fulfilled than opportunity denied. At the same

time it must be said that the British artists more than held their own with those from the Continent. The point is that the selection of some artists of insufficient talent in no way damns a scheme which at its best produced some very striking works. And it is significant that almost all the most successful pictures were wholly or in part non-representational.

We have devoted space to these comments because the organization of such an ambitious scheme may have quite far-reaching consequences. In a world which tends to grow increasingly materialistic, the survival of spiritual and artistic values cannot safely be left to chance. Their preservation becomes a stern duty, and Shell are to be congratulated on their recognition of this fact. Now that the example has been set who knows to what extent the idea may develop? Even the gas industry, sober and industrious as it is, may yet make some gesture in the cause of art. The position is difficult because patronage of this nature, even if relatively inexpensive, is open to public criticism on the grounds of wasting public money. Any such venture on the part of gas, electricity or coal must stem from firm Ministerial ruling. But that is by no means impossible and it is highly desirable. The day may yet dawn when the artist and his easel are a common sight on the gasworks, although this prospect is likely to be regarded with mixed feelings by the gas engineer.

THE SMALL VOICE

THE more we see of the bodies concerned with the furtherance of solid fuel, the more impressed we become by their vigour and initiative. The interesting thing is that the new lease of life for solid fuel, which has come about largely as a result of their promotional activities, is of very recent origin—since nationalisation in fact. State ownership of the mines was probably the spark which started this cheerful blaze of publicity and public recognition. Prior to that, although there existed bodies whose function it was to develop various facets of the solid fuel industry, their work was carried on in a mysterious way and the great world knew them not.

Today the picture is very different. The National Coal Board is bent on glamorising this most unglamorous subject, and in showing the world that the miner is a key member of society. The Coal Utilisation Council, thanks to the drive and imagination of its leaders, has achieved an extraordinary amount of progress in a short space of time, cloaking the new 'improved' appliances with a magic which seems far removed from mere ironmongery. The National Smoke Abatement Society has played an important part in emphasizing the necessity for a new approach to fuel-burning habits. In addition there are a number of other associations all going in more or less the same direction. Wisely, many have sheltered under the same umbrella, and the Solid Smokeless Fuels Federation has become a power in the land. But the situation is apt to become a little confusing, and at times one has to look twice to see who is selling smokeless fuel and who is selling bituminous coal.

These thoughts were occasioned by the opening of the third exhibition put on by the S.S.F.F. at Charing Cross Underground Station. The gas industry was much in evidence, as was only to be expected when Mr. H. F. H. Jones is Chairman of the Federation. But somehow there was a feeling that for all its participation in the cause of solid smokeless fuels, the gas industry has by no means got into top gear. It is as though there is a reluctance to give coke the support it assuredly needs. For let us have no doubts about the extent of the prejudice which has to be overcome. Coke is burned in vast quantities, but by-and-large it is not a popular fuel. If only it could have the same intensity of build-up which is being given to gas, and also by the C.U.C. to solid fuel generally, we should feel a lot happier about its future. Of all the voices raised to the glorification of solid fuel, that of coke should be the loudest. Why then is it so uncertain and at times so out of tune?

RESEARCH IN INDUSTRY

RESEARCH in industry was the subject of an address by Dr. C. B. Davies, Manager of the Thornton Research Centre (Shell Mex and B.P., Ltd.) to the North Western Fuel Luncheon Club recently. There was, he said, a significant difference between the academic and the industrial research worker. The former often skims the cream off a new line of investigation, dropping it when it loses interest or fails to yield results. The latter must restrict his work to subjects relevant to his employer's interests and must pursue them until concrete results are secured. Thus, while many imoprtant discoveries have come from the academic world, as in atomic energy, full exploitation is achieved through the systematic, business-like approach of industrial research. Industrial research must be justified financially or be subsidized by Governments on grounds of national expediency. An industrial organizationn meeting the full cost of its own research would spend about 3% of its turnover in this direction. The aircraft industry, supported by the Government, spends 12 to 13%. Dr. Davies outlined the development of a research organization serving a private company. The cost per man employed would be from £1,000 to £2000 per annum. Buildings and equipment would bring the cost to £2,000 to £3,000 rising to £4,000 to £5,000 where full scale equipment is employed.

Generally, he emphasized the need for constant collaboration between the laboratory worker and the man 'in the field.' The industrial researcher must keep his feet on the ground. He concluded with two striking quotations from America. Mr. Dettering of General Motors had said: 'Industrial research is a process of finding out what you are going to do when you can't keep on doing what you are doing now.' Dr. Work, of the University of New York, 'The supporters of applied and development research are not content with the intellectual growth of the researcher. They want results, and they want them in time, before another company, industry or country attains them.'

OUTLOOK FOR EUROPEAN COAL INDUSTRY

With 'tempered optimism' is how the Coal Committee of the Organisation for European Economic Co-operation views the short-term trend of the coal market in its member countries. In 1955, coal consumption might rise by 5 mill. tons if the winter is much more severe than last year. Says the report: 'Consumption may be favourably affected by the greater activity in the steel industry; it might rise as a result of the expected increase of 8% per annum in requirements of thermal electricity, and this in its turn might be affected by next year's hydro conditions; it will have to face competition from fuel oil in O.E.E.C. countries where this latter source of energy is more economic; it will tend to decline in Italy as a result of the development of new sources of natural gas; while nuclear energy will not compete with coal in any immediate future.'

In its general conclusions, the report says that overall consumption in 1955 will depend largely on the level of industrial production and more especially the output of iron and steel and the probable increase in consumption in thermal power stations, gasworks and other industries.

Personal Notes

THE DUKE OF EDINBURGH has promised to visit the Partington (Manchester) works of the North Western Gas Board on February 23.

MR. G. R. BUCKLEY, General Works Manager of the Stanton Ironworks Co., Ltd., has been appointed a Director of the Company.

MR. J. E. BRADSHAW will retire from his appointment as Deputy Chairman of the Northern Gas Board at the end of April, on completion of his term of office, but will remain on the Board as a part-time Member. The Minister of Fuel and Power has appointed Mr. J. E. WHITE, at present General Manager of the Board's Newcastle Division, to succeed Mr. Bradshaw with effect from May 1. Before vesting day, Mr. White was connected with the Newcastle-upon-Tyne and Gateshead Gas Company, of which he became General Manager early in 1949.

MR. H. A. HUNT, Trowbridge, has retired from the service of the South Western Gas Board, and at a ceremony at the offices of the Board at Bath last week he was presented with a long-service certificate by Mr. C. H. Chester, Chairman of the Board. Mr. Hunt is well known in the Trowbridge-Bradford district, where he has been connected with the gas undertaking for many years. From 1921 until it was amalgamated with the British Gas Light Company at Trowbridge he was Manager of the Bradford-on-Avon Gas Company. After the take-over he had supervision of both the Bradford and Warminster gasworks, and when the Bradford works was closed in 1936 he became Distribution Superintendent for Trowbridge, Bradford, and Warminster. For a period during the war he worked in the eastern counties, and returned to Trowbridge after the war to resume his duties here.

MR. J. HUNTER-RIOCH, General Manager of the Eastern Gas Board's Cambridge Division, proposed the time-honoured toast to 'The Immortal Memory' at the annual Burns Night dinner arranged by the Halstead and District Caledonian Society. It was fitting, he said, that the memory of Robert Burns should be honoured on such occasions, for friendliness, hospitality and kindness ran through his character like a golden thread. He expressed the thrill of friendship in that immortal song 'Auld Lang Syne,' which encircled the globe and joined millions together one with another and with the poet. Mankind in general was indebted to Burns, but Scots were especially indebted to him, for he hallowed the Scots nation. At one time even the Scots dialect was in danger of being forgotten, but Burns enshrined it for ever in his immortal songs, and enriched the literature of his native land. With the passing of the years had come an even greater appreciation of his virtues, and he was now an international figure. Burns was a great Scotsman, not just of his age, but of all time.

MRS. D. K. GREEN, wife of the Senior Engineer in Charge of the Coventry undertaking of the West Midlands Gas Board, has been appointed Chairman of the Coventry branch of the Women's Gas Federation in succession to MRS. A. E. WEST, now Chairman of the branch at Rugby, where her husband is Engineer and Manager. The Coventry branch recently presented Mrs. West with a handbag in appreciation of her work during a period of over five years.

MISS MARJORIE LOVELL BURGESS, Lectures Officer of the Gas Council, has been awarded the Premium of the Society of Engineers for one of the best lectures of the year. Miss Lovell Burgess gave a lecture to the Society last October on William Murdoch, founder of the gas industry. She is the first woman for 25 years, and only the third in the Society's 100 years history, to receive the award. The last woman to receive the award, in 1930, was the famous airwoman, Miss Amy Johnson.

MR. E. HARDIKER, Divisional General Manager, Walsall and District Division, West Midlands Gas Board, retired on January 31, after more than 40 years in the gas industry. He studied at the Manchester School of Technology, and received his early practical training with the Bolton Gas Department, rising to the position of Assistant Engineer and Manager there. At Bolton he was responsible for the supervision and reconstruction of two large works, and was later seconded by the Town Council as Gas Engineer Consultant to the first Lord Leverhulme in connection with the commercial and industrial development of the Outer Hebrides. In 1920 he was appointed Engineer and Manager of the Smethwick Corporation Gas Department, being one of the youngest men in the country to hold a position of such responsibility in the industry. During his period of service there, the obsolete plant was reconstructed, and the whole of the undertaking placed on a sound financial and administrative basis. In 1945 the Borough Council presented Mr. Hardiker with an illuminated address, recording appreciation of the high standard of efficiency to which the undertaking had been raised. Mr. Hardiker was among the first engineers to recognize the potentialities of gas in the industrial field, and through his efforts the gas sold to Smethwick manufacturers now represents 50% of the load. Under his guidance the output of the works expanded from 695 mill. to 1,400 mill. cu.ft. per annum, the price of gas dropped to one of the lowest in the Midlands, and the high capital debt on the undertaking was wiped out. When the industry was nationalised, Mr. Hardiker was appointed by the West Midlands Gas Board as Divisional General Manager of the Walsall and District Division. He served on several local and national committees, and during the war was a member of No. 9 Regional Gas Emergency Advisory Board.

MR. W. E. CONE, Technical Adviser to the British Road Tar Association, has been invited by GOKEF (Sales Association for the By-Products from Swedish Gas and Coke Industries) to give a lecture on 'Dense Tar Surfacing for Use on Airfields' at Stockholm, Sweden, and Helsingfors, Finland, on February 14 and 17.

MR. W. N. WARWICK, Assistant General Works Manager of the Cargo Fleet Works, Middlesbrough, of the South Durham Steel & Iron Co., Ltd., has been appointed General Works Manager in succession to MR. G. BARRY THOMAS, who has resigned. Mr. Warwick was with the Woodall-Duckham Construction Co., Ltd., for seven years before joining the South Durham Company in 1934 as Coke Oven Manager. He was President of the Coke Oven Managers' Association 10 years ago.

Obituary

MR. WILLIAM CARLING, former works superintendent at Penrith Gasworks has died at the age of 56. In 1948 he left Penrith for Barnstaple and two years later moved to Ratcliffe, Manchester.

MR. FREDERICK WILLIAM CLAPHAM, an Executive Director of Clapham Bros., Ltd., gas plant makers, of Keighley, collapsed and died at his home at Morecambe on February 1. He was 73. Associated with the firm for half a century, Mr. Clapham was also a Director of John Lund, Ltd., machine tools, Eastburn, and also of the Devonshire Buildings Co., of Keighley.

MR. ERNEST JAMES SUTCLIFFE, Engineer and Manager of the Bradford Corporation Gas Department from 1927 to 1931, died at his home at Menston, Yorkshire, on January 30, aged 88. Mr. Sutcliffe started his career in the gas industry as an articled pupil with the late Mr. Leather, of Burnley, in 1882. He later entered the service of the Bradford Gas Department and, after service in various capacities, he received an appointment as Deputy Gas Engineer and Manager under the late Mr. Charles Wood, O.B.E., whom he succeeded as Engineer and Manager in 1927, and in turn retired in June, 1931. Since his retirement, Mr. Sutcliffe maintained an active interest, not only in the Bradford undertaking, but in the industry generally. He took an active interest in the advancement of professional knowledge and experience, and he was a founder member of the Yorkshire Junior Gas Association. Many members will remember him with affection, particularly those who were present at the Jubilee Celebration Dinner of the Association in 1953, which Mr. Sutcliffe attended. Although, due to his age he had latterly withdrawn from outside activities, his presence will be missed by many and he will be gratefully remembered by many members of the gas industry for his kindness and courtesy and for the help and advice he was happy to provide on all occasions.

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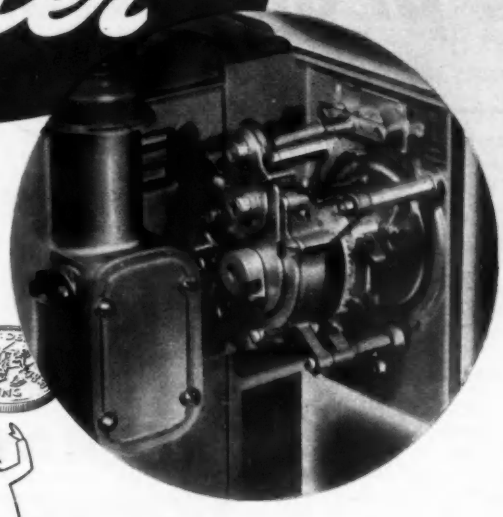

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6H14

Mr. V. W. Stanton, Commercial Manager, South Eastern Gas Board, describes the aims of the course to the students on the opening day.

Training of District Representatives

We describe the central training establishment for district representatives which was recently opened by the South Eastern Gas Board at Vauxhall.

DURING the course of last week we were privileged to examine the accommodation which has been provided at Vauxhall by the South Eastern Gas Board for the training of candidates for posts as district representatives with that Board. It has been fully realized by this Board that today gas has to be sold to the public in the face of fierce competition from electricity costing little more per therm than their own product, and which has certain advantages to offset those of gas. Furthermore, another fuel, oil, has entered the field in quite a big way, and threatens a number of the markets for gas, particularly in more rural areas. Consequently, it is vitally necessary that the representatives of the gas industry amongst the public should be fully briefed as to what gas has to offer, why it is the best fuel for particular purposes, what those purposes are, what appliances are available, how they should be used and so on.

Certainly nothing has been left to chance with the scheme inaugurated by the South Eastern Gas Board, and there is every evidence that the question of providing the right type of man for the job and then seeing that he is suitably trained, is being tackled resolutely and on a long term basis. Vacancies for district representatives have been advertised throughout the Board's area and applications have been received from a number of employees including fitters, clerks, works staff, etc. In each case the prospective candidate for training under the new scheme is first interviewed by the Sales and Service Manager of the division to which he belongs. The purpose of this interview is to ensure that the applicant has the makings of a good district representative and that he will benefit from attendances at the school. Clearly, a course of eight weeks' tuition, which is the present requirement of the Commercial Manager's Department, costs the Gas Board quite a lot of money, apart from the fact that the services of the trainees in their previous capacities are lost to the Board for two months. Obviously, it is desirable that only suitable candidates go forward to the training centre. At the present time 14 trainees are undergoing a course at Vauxhall, and although this particular course is in its early stages the officials concerned feel quite confident that it will be as successful as the first course, just completed.

The accommodation at Vauxhall comprises two main sections—a lecture/demonstration room on the first floor with seating capacity for 24 people, and a demonstration/practical workshop on the ground floor for instruction in the construction, operation, installation and maintenance of gas appliances. Pictures of these and also of groups of the present trainees accompany the text of this article. Mr. J. H. Arnold, Secretary of the Training and Education Advisory Committee, is responsible for the general administration and co-ordination of the Centre and Mr. Perriss, an instructor from the East Surrey Division, has been seconded to take charge of the practical work and the details of day-to-day operation.

The course itself is divided roughly into four main sections. These comprise gas technology which takes approximately 50% of the time; salesmanship 25%; district office organization and methods, 15%; and other departments and their operation, 10%. The instructors for the different sections are gas technology, Messrs. Claxton and Buxton; sales-

Fig. 1. Eleven pupils, supervised by Mr. C. E. Perriss (centre), undergoing instruction in estimating, cutting and threading, joint blowing and water heater testing.

manship, Mr. Hardy; district office organization, Messrs. Walsh and Davies, all of the Commercial Manager's Department. Consideration of the other departments and their operations is guided by appropriate senior officers of those departments.

An idea of the wide scope of the scheme can be gained from a study of Table I which shows the syllabus for the first week of the present course. Each day is divided into four periods, the first being from 9.15 a.m. to 10.45 a.m.,

Fig. 2. The Chairman of the South Eastern Gas Board, Mr. W. K. Hutchison, inspecting a newly-made joint. Mr. G. F. Claxton, instructor in gas technology, is on right.

the second from 11.00 a.m. to 1 p.m., the third from 2 p.m. to 4 p.m., and the fourth, for private study and note writing, from 4.15 p.m. to 5 p.m. The only exception to this arrangement is that on Saturdays there are two test papers occupying the morning from 9.15 a.m. to 11.30 a.m. Altogether quite an intensive programme! Although not shown in Table I, other weeks of the course include visits to gas appliance manufacturers' factories where the students are able to gain a deeper appreciation of the considerations underlying the design and

TABLE I
Selection Course—Trainee District Representatives
First Week

Date	First Period	Second Period	Third Period
1955 Jan. 31 .. Monday	Introduction ..	Technology .. (Manufacture)	Personal Attributes (Discussion Group)
Feb. 1 .. Tuesday	Technology .. (Combustion, etc.)	Technology .. (Combustion, etc.)	Office (Commercial Organisation and District Service Office System)
Feb. 2 .. Wednesday	Sales .. .. (Salesmanship and The Gas Industry)	Sales .. .. (Market for Domestic Heat Services)	Practical (Pipe sizes, basic fittings)
Feb. 3 .. Thursday	Office .. .. (District Service Office System)	Office .. .. (District Service Office System)	Sales (The Selling Process)
Feb. 4 .. Friday	Technology .. (Combustion)	Technology .. (Pressure)	Practical (Pressure, Flames and Burners)
Feb. 5 .. Saturday	Test Paper .. (9.15-10.15) Sales and Office	Test Paper .. (10.30-11.30) Technology	—

construction and appliances, and a visit to the Central Laboratories of the South Eastern Gas Board where they can see how appliances are tested for safety and efficiency in use. On the occasion of our visit, we had the opportunity of 'sitting in' on one of the sales periods, and were struck by the very high standard of the lecture and the pertinent questions which were asked of the lecturer by the trainees. Discussion is encouraged at all these lectures, not only as a means of furthering the actual knowledge of the candidates, but also to develop their confidence in themselves in explaining a point of view and putting over their products. It will be seen from Table I, that 'personal attributes' and their development, have a well-defined place in the curriculum; this is clearly regarded as a most important aspect of the training for, in the last analysis, it is the *personality* of the district representative, as much as anything else, which influences the decision of the customer. In this connection it is interesting to note that exercises are carried out in dictation and letter writing since the district representative needs to be able to project his ideas as clearly on paper as by the spoken word.

Any attempt to describe in detail the ramifications of the course in the space at our disposal is bound to fall short of the ideal. Suffice it is to say that all those aspects of appli-

Fig. 3. Mr. O. Buxton, instructor in gas technology, with some students in the lecture room.

ance construction, installation, operation and maintenance which can possibly concern a district representative, are dealt with in detail, not only on a theoretical plane, but also from the practical point of view. In the workshop/demonstration room is a wide and representative range of all kinds of gas appliance, and here the trainees are told how they work, how to take them to pieces, how to demonstrate them, how to advise on installations and a host of other things. As can be seen from Fig 1, in the centre of the workshop

Fig. 4. Experience in cutting and threading. Messrs. A. Dilnot (left) and L. Mills.

is a bench with vices and other tools where the prospective representatives can find out for themselves—if they don't already know—how to make pipe joints, what fittings are in general use and how they can be best employed in any particular set of circumstances.

On the Saturday of each week of the course there are the tests to which we referred earlier; these show whether the student is progressing satisfactorily or whether he appears unlikely to make the grade, perhaps in a particular subject. On the basis of these results the officials running the course decide where to lay particular emphasis with each candidate to help him to overcome a deficiency which might otherwise spoil his chances of success. In a class of 14 it is possible to give a fair amount of individual attention, and clearly the instructors aim to do all that they can in this respect. During the period of the course the student is put through his paces in a most practical manner—among other

Fig. 5. Mr. C. E. Perriss, in charge of the practical work, chats with some of the students during coffee break.

Fig. 6. Making a 'blown' joint during the practical instruction. Messrs. J. Cross (left) and E. Moon.

tests he is taken to the showroom containing all the appliances and told to 'sell' a particular appliance to the examiner who, drawing upon his extensive knowledge of customers' foibles, invents all manner of reasons for not buying it. This might truly be termed the 'acid test' and confirms the conclusion that if the newly-trained candidate can satisfy the stringent requirements set for him at Vauxhall—and we have seen some of the test papers—the South Eastern Gas Board is going to have one of the strongest and best trained band of district 'reps' in the country.

OIL REFINERY IN INDIA

India's largest oil refinery has just come into operation on Trombay Island, Bombay, with a capacity of 2 mill. tons a year. Processing crude oil from the Middle East, its output will supply nearly half of India's requirements of petroleum products, including petrol, kerosene, diesel oils, furnace fuels, and bitumen. The distillation unit started up a few days ago and the remaining major facilities, which include a catalytic cracking plant and a bitumen plant, will be brought on stream within the next few months. The project is being carried out by Burmah-Shell Refineries, Ltd., which has authorized capital of £20 mill.

POSSIBILITIES OF WELDING

*By C. W. Brett, M.Inst.W.**

IN the production of gas, also in its wider fields of application, the problems associated with maintenance requirements are often among those of major importance. In this connection welding techniques are frequently applied, although their possibilities are not always exploited to anything like the extent that would appear merited by the results. Moreover, there are not a few maintenance engineers who, in varying measure, are unfamiliar with the possibilities of the various services that are obtainable nowadays.

Apart from certain technical developments, which will be described later, it is significant that an increasing number of welding repairs are handled on site, particularly when no subsequent machining is essential. It is invaluable to a maintenance engineer to know that in the event of a breakdown he can call upon the help of welding specialists at any time of the night or day and that, at least as far as Barimar Ltd., is concerned, specially trained operators, together with mobile welding equipment, are in constant readiness to leave for any place where their services may be needed.

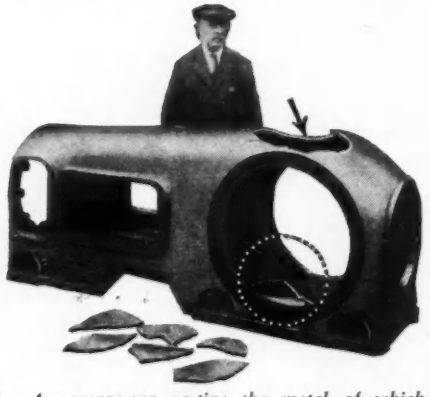

Fig. 1. A compressor casting the metal of which is of exceptional thinness for a piece of plant of this size. Large pieces have been broken out of it and some of them lost.

Gas welding is usually applied to cast and malleable iron, the electrical method being confined mainly to steel, although the demarcation is not rigidly defined. Notable progress has been made recently in the matter of heat control; so much so, in fact, that except in special cases preheating a component prior to welding is regarded as obsolete practice. Sometimes it is desirable to reduce the temperature of the oxy-acetylene flame which, normally, is of the order of 5,000 to 6,000° F. and a simple method of doing this is by admitting mains gas to the burner, thus controlling the intensity of the flame. A factor that is often overlooked is the exceptional skill and experience required of an operator in order to perform truly first class welding which can be guaranteed on a money-back basis; the equipment used must also be thoroughly up-to-date.

A considerable proportion of the specialist welding work undertaken for the gas industry does not involve fracture but has more to do with the onslaught of corrosion which, incidentally, can bring about totally unexpected failure. It is the invariable aim of welding specialists to achieve a solution which is not only a complete restoration but an improvement upon the original. In cases of breakage this implies added strength, but when corrosion or wear are the root of the trouble, then the new metal that is applied is selected on account of its resistance to any repetition of the failure that has occurred. Surprisingly good results have been achieved with stainless steel, monel metal and other materials.

* Managing Director of Barimar Ltd. (Scientific Welding Engineers)

In protecting steel from corrosion, metal spraying is sometimes used; this is not true welding but a useful off-shoot. Any matt surface can be metal coated with no more difficulty than that associated with the use of a paint spray, and if zinc is applied the result is equal to the best galvanizing as a means of protection against corrosion. When steel plates are dipped in zinc the zinc is often ruptured during subsequent riveting or other form of fabrication but spraying can correct these small local faults. The spray gun normally used in this process involves the use of oxygen, acetylene and compressed air. The last named is used to eject the molten particles as they are formed by passing either a wire or powder of the metal it is desired to spray through the oxy-acetylene flame.

Work received by welding specialists from gas undertakings often includes pumps of various kinds and it is not uncommon to receive a unit of this type with the request that it must be returned within 24 hours ready for re-fitting. This is not an unreasonable demand, for the preparation and actual welding are likely to take only a few hours. Of course, the utmost accuracy of alignment must be preserved; in fact, this is a far greater test of welding experience than the attainment of the required strength. The welding having been completed, the partially reconditioned pump is passed to the machine shops of the specialist firm undertaking the work. Final accuracy is assured to within one-thousandth part of an inch thus making certain that there will be no difficulty in re-assembly. All things considered this high quality work is remarkably inexpensive for seldom is the cost more than a small part of that of a replacement which also, usually, involves severe loss of time. Indeed this latter consideration may make expenditure a secondary consideration. Opportunities for welding repair in the gas industry are very extensive; they can occur in coal and coke handling plant, power plant, exhausters, pumps and process vessels, while the aid which can be afforded to road vehicles is equally valuable. Even such highly stressed components as crankshafts can be reunited perfectly after they have been broken and, moreover, distorted in the process.

Fig. 2. The same casting a few days later when all the damage had been successfully repaired by scientific welding. (Repaired in the Barimar Welding Works.)

Meticulous care is taken to ensure that welds are completely dependable. This is ensured by rigorous inspection at every important stage of the welding process and comprises not only surface examination but also the use of radiography. By means of special equipment, employing mainly gamma rays, the work is scanned in depth. Any flaw which may be present is consequently detected at once, and measures for its elimination can be taken.

Gas Engineers and Prevention of Air Pollution

Dr. G. E. Foxwell, Member of the Beaver Committee, initiated a discussion on the Beaver Report at a meeting of the London and Southern Section of the Institution of Gas Engineers at Church House, Westminster, on February 1. The meeting was presided over by Mr. E. O. Rose, Chairman of the Section.

DR. FOXWELL, having recalled Sir Harold Smith's blessing of the Report and the statement in the House of Commons that the Government had decided in principle to adopt the policy recommended by the Committee, while reserving its position on individual proposals, said the gas industry had to get down to ways and means. Before coming to ways and means he sought to indicate the broad task that lay before the carbonizing industries. On the industrial side, they regarded gasworks and coke ovens as potential sources of air pollution. They agreed that most of these works could not be expected to become smokeless overnight and that there were no immediate and economic means known for preventing the discharge of dust, smoke, and noxious gases, for example when charging intermittent retorts and coke ovens, and when quenching coke. Consequently, the Committee had asked that such works should be brought within the purview of the Alkali Inspectorate. This meant that they would be exempt temporarily from the smoke provisions of the Clean Air Act, but that in addition to tackling the millions of domestic motes, they would be expected to remove the beam from their own eye within the shortest practicable time.

The Chief Task

The chief task of the carbonizing industries would be to remove the smoke from domestic chimneys in the black areas. Black areas were defined as 'areas which experience a high frequency of fog and in which urban or industrial density produces a large amount of pollution.' In those areas there was burnt some 19 mill. tons of smoky house coal, and the replacement of that was their target. Some of this coal, as they would have seen in the Report, was assumed to be displaced by smokeless coals containing less than 20% of volatile matter, by hard coke and by Phurnacite and low temperature coke. These replacement fuels would be derived partly from new production scheduled to come into operation over the next three years and partly by transferring coke from existing users who could burn bituminous coal smokelessly.

Transference or 'switching' was in itself a major operation and entailed for the gas industry the serious effect that existing markets built up by years of hard work would be abandoned in order to supply coke to the domestic user, who up to date had shown little or no desire to have it. According to the Ministry *Statistical Digest* for 1953, in that year the gas industry, out of a total production for sale of 12 mill. tons of coke, sold only 2.66 mill. tons to the domestic consumer; the coke oven industry sold only 0.36 mill. tons. There was a long way to go.

Moreover, all the solid smokeless fuels derived from the coal industry and the coke ovens were suitable mainly for closed stoves. It would ease their problem if the domestic consumer abandoned his open fire and changed to a closed stove. Unfortunately, the evidence received from all sources indicated a very strong desire to retain the open fire and a very small demand for the closed stove. The gas industry must therefore visualize, as explained in Appendix XI of the Report, the carbonization of up to 10 mill. tons of additional coal in order to complete the replacement of the 19 mill. tons of smoky house coal in the black areas; moreover, and this was important, according to the evidence collected the bulk of the coke transferred or specially produced by the gas industry for this programme would be used in open fires. This demand, as the Report explained, could not be economically satisfied by coke alone, but in many cases gas must also be used.

The Committee visualized that over the next 15 years the administrative technique would be this:—

(1) Within about three years industrial smoke, including grit and dust would be reduced over the whole country to about 80% of what it was today. This involved the provision of the proper plant, a good standard of maintenance, and skill in firing. The local authorities would be responsible for enforcing the law.

(2) Local authorities would set up smokeless zones and smoke-control areas in which no domestic consumer might burn a fuel containing more than 20% volatile matter.

(3) Before bringing a smokeless zone or smoke-control area into force the local authority would consult with all the interests concerned to prepare a programme involving availability and distribution of fuel, including new production, and the production and installation of appliances. Since the Minister of Housing and Local Government had to approve all orders setting up these areas, the national tempo would be controlled through the Minister to ensure that the rate of formation of these zones and areas did not outstrip the availability of fuels and appliances.

The Report visualized that one ton of house coal was replaceable by 16 cwt. of solid smokeless fuel, allowing for the unsatisfied demand, so that the replacement of 19 mill. tons of house coal might require 15.2 mill. tons of solid smokeless fuel. Where was the additional coal for carbonization to come from seeing that the gas industry could not now get enough coal? The Coal Mines Nationalisation Act, 1946, Section 1(1)(a) proclaimed as one of the duties of the National Coal Board that of 'making supplies of coal available, of such qualities and sizes, in such quantities and at such prices, *as may seem to them* best calculated to further the public interest in all respects . . .' The Beaver Committee had made this recommendation: 'Clean air should be the declared national policy and such should be regarded by the Government and by the nationalised fuel industries as an essential element of fuel policy in the future.'

Coal Sources

The Committee believed that the required coal should be secured completely from either of two separate sources: (i) From the 19 mill. tons of house coal that was to be replaced by the products of carbonization. If they released it, why not carbonize half of it? No one else really wanted large coal. (ii) From the 60 mill. tons of coal of the coking types now used for purposes other than carbonization or the domestic fire; if they were to use oil or non-coking coal to displace coke, why could not they equally displace gas coals now used in similar establishments? The Committee was convinced that with determination and good will on all sides the 10 mill. tons could be found without real difficulty from this source.

There was finally the possibility, even the probability, of blending non-coking coal with gas coal for the manufacture of gas and reactive coke, and thus extending the range of coals used for the production of smokeless fuel.

The 10 mill. tons was a maximum. If more of the 19 mill. tons of house coal was replaced by oil, by electricity, by gas, or if there could be found additional suitable coke from other sources—including coke ovens, low temperature coke, and transferred coke—the 10 mill. tons of new capacity would be proportionately reduced.

To return to carbonization for the purpose of producing smokeless fuel demanded a reversal of the policy of increased relative production of water gas and oil gas foreshadowed in 'Fuel and the Future.' The Gas Council assured the Committee that, given the coal and the markets for coke, the gas industry would return to carbonization. That was one reason why they linked clean air to national fuel policy.

The next problem was the quality of the solid smokeless fuel which they had termed 'open-grate coke.' Throughout its investigations the Committee was met by the objection all over the country that coke as now provided was unacceptable

for the open fire, and that it was regarded as a low-class fuel, even (in the North), also that to use coke was an admission of lower social status. The Committee had emphasized the need for producing a more reactive coke—and that applied not only to the new production from the 10 mill. tons of additional coal but to present production and to existing coke that would be 'transferred' or 'switched' into the domestic market. Gas engineers would have to consider what was to be the specification for this fuel, and how it could best be made. Would the entire output of gas coke be of open-grate quality, or would two or more qualities be made? The Report had given a lead in several directions. What did the gas industry propose to do about this problem? They might declare that they were satisfied with what they had but clearly the British public was not. The Committee had envisaged British Standards for coke quality with which all area boards and the N.C.B. would undertake to comply.

Another problem on the manufacturing side was that of keeping the new and costly production plant working at a satisfactory load factor. Should the units turning out open-grate coke operate as base-load plants, the coke being stored in the summer, or did they visualize much the same operation today, making coke solely in response to the demand for gas? Could they make enough coke in the winter months to satisfy demand? The answer was bound up with the extent to which consumers could be persuaded to use a combination of gas and coke.

Marketing and Distribution

It was probable that the improved open-grate coke would entail increased production and storage costs and might have to be sold at a higher price. The Air Pollution Committee believed that if the quality was right, people could be persuaded or educated to pay more a ton but less a year for the same amount of heat. The problems that this entailed might be discussed. He did not think they should regard better screening or quenching as an increased production cost specific to this programme. The gas industry should do this anyway.

It would be necessary to make more frequent deliveries of coke and arrangements must be made for this by producers and merchants. They had been told that it would be cheaper to deliver a sack a week to every house in a street than to deliver haphazard over a district.

The Report proposed that a modest subsidy should be given to assist in replacing solid fuel appliances. Where an old-fashioned solid fuel cooker had to be replaced, the Committee visualized also subsidizing a simple type of gas cooker. It would be for the gas industry to set up favourable hire-purchase terms that would enable and indeed persuade consumers to buy better appliances, and to add other gas and coke-burning appliances in other than the main rooms—appliances for which no subsidy would be given.

Although the Committee accepted the view that a combination of gas and coke would be necessary in at least a proportion of the houses, it did not go so far as to reproduce the evidence of the Gas Council on the value of that combination; though it recognized in gas the answer to part of the intractable sulphur problem. Was the gas industry satisfied that nothing further could be done by promotional tariffs? Members of the Committee were not very happy about the Gas Council's view that nothing further could be done. The carbonization programme of a further 10 mill. tons a year involved the possibility of a surplus of gas. It was believed that this surplus would readily be absorbed in the course of the 10-year period by industry or elsewhere, but the disposal of that gas created a problem in gas sales.

Challenge to the Industry

The Report, whether the Government implemented it by legislation or not, provided an opportunity and a challenge to the gas industry. What the future held was always uncertain and therefore the Report contained the warning that the future pattern of fuel consumption in this country might change. Many interesting and exciting developments were afoot, and no man could foretell the outcome. The Committee was chary of building an edifice on the foundation of research possibilities that might prove insubstantial, and therefore based its pattern on present conditions. A carbonizing plant should last for 40 years, and they could not afford to make mistakes. Nor could they afford to sit back and do nothing. The National Coal Board was working intensively on this problem of the economic production of what it termed a 'premium fuel.' If it succeeded, would the gas industry be left with no market for its coke, and nothing but gas to sell? He believed that whether the Government adopted the recommendations or not, the gas industry would be faced with demands similar to those envisaged. Public opinion was aroused and local authorities would take action, as indeed they were already doing.

A Practical Effort

Mr. L. W. Andrew (Manager, Watson House) said others had dealt or would deal with the excellence of the Report and methods of making certain that the required fuels were available to keep up with smokeless zones. He must, however, be permitted to congratulate the Committee on producing not just another restatement of a known problem, but on having produced something really vital which might well cause things to happen. It was certainly not a mealy-mouthed report and it was a practical one.

When one talked of smoke abatement and coal conservation, the case for gas and coke was so strong, one almost became frightened and looked for a concealed snag. He did not think there was one—but there was a lot of public ignorance and complacency. The political and publicity aspects were again not his concern, but as he saw it these aspects were as important as the technical ones, for nothing would probably happen unless people really believed and had brought home to them the present shocking state of affairs, and one good start, he suggested, was that there should be a crusade among the enlightened. It would be something if everyone who knew of the Report, and believed it, would implement the recommendations in their own homes and among their own friends. Might he say at once that he was without smoke, and happily so, in his own home!

His main purpose was to emphasize the part that the combined gas and coke service could play. He did not believe that the Report did full justice to the contribution of gas in that combination. The Gas Council in its evidence to the Ridley Report answered in detail, and convincingly, the following question from the Committee on National Fuel Policy: 'How can the fuel requirements of an average household best be met by the use of gas and coke?' The answer given was so important that he risked boring those who knew for the benefit of those who had forgotten, by a repetition of certain parts.

Investigations showed clearly the advantages and economy of an installation comprising a solid fuel appliance in the living room providing the main winter space heating and hot water supply, with gas for all other purposes including all-the-year-round cooking and laundering, mild weather heating in the living room and complete summer water heating. Such an installation provided a service: (i) with the lowest possible expenditure of basic coal—*i.e.*, about 3½ tons per household per annum; (ii) in which the services for which gas was used were obtained at least as economically as with solid fuel: (iii) which not only gave the tenant an improved standard of comfort at low cost but, being flexible, permitted him to have a higher or lower standard according to his needs and means: (iv) which gave a high degree of labour-saving in winter and complete freedom from solid fuel in summer; and (v) with a load factor favourable to the economic production of gas.

Something Better at No Increased Cost

They were, therefore, not giving the users something they did not want or could not afford, but were giving them something better at no increase of cost to themselves, while providing real smoke-abatement and real coal conservation. He hoped he would not be accused of thinking of human beings on too low a moral a plane if he suggested that it was a good thing that what they were offering was in all respects better than that which they were replacing.

It should be noted that the use of gas recommended was 180 to 215 therms per annum per household; which was greater than the present average and meant a higher proportion of water heating and space heating in relation to cooking. If such changes took place then the present pattern of domestic consumption of 65% to 75% cooking, 12½% to 17½% water heating, and 5% to 10% space heating would be revolutionized, and while the total cooking load would increase rather than diminish, the proportion of water heating would be say, 35%

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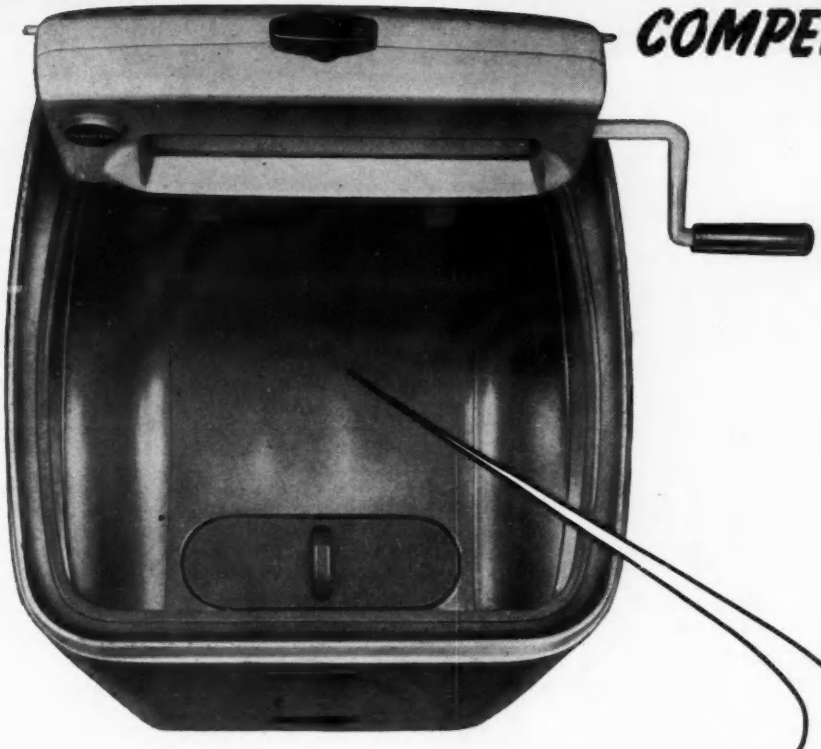

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and space heating 20%. He did not, therefore, foresee a serious problem in providing the sales for the gas in relation to the coke. They should remember that as far back as 1937 a block of 68 artisan flats was sponsored by the Gas Light and Coke Company, in which each flat was equipped with an independent coke fire, gas cooker, gas wash boiler, small gas multipoint water heater, and a gas fire in one bedroom, and gas was used for lighting. The total average annual consumption of coke post-war was 30 cwt. and of gas 320 therms (excluding lighting), the total coal equivalent being, therefore, about 3.75 tons. The average population per flat was five, of whom two-thirds were adults.

Although he was not supposed to be dealing with the availability of smokeless fuels, he would remind them that the use of coke and gas for their proper purposes, and any developments in appliance design which improved practical efficiency, represented as much a gain in smokeless fuel available for smokeless zones as an increase in the production of those fuels. That point was less often expressed by the engineers than by the technicians on the utilization side.

Problem of Capital Costs

When they were considering the use of gas and coke appliances in old and new property, the problem of capital cost of appliances and flues, and the restrictions due to the use of conventional fireplaces were bound to arise. Such considerations affected the practical efficiency of appliances to a considerable extent. He suggested, however, that when one was thinking in terms of a problem costing £250 mill. a year, they might think more boldly in terms of capital cost.

There was one other aspect of the combined use of gas and coke which was not always fully appreciated, and that was the extent to which gas could be used economically for water heating and space heating in a climate such as ours. It might well be that they should think of winter as, say, three months and not the more conventional five months and that three months would not necessarily be spread over a continuous period. To quote from his personal experience of gas and coke, he was constantly surprised at the many days, or even weeks, in the conventional winter when it was not worth while lighting a solid fuel fire, and, conversely, there were peculiar days in, say, the theoretical spring when the smokeless solid fuel appliance was worth while.

He would like to introduce an encouraging note in relation to recent developments which would help them to obtain the greatest practical efficiency from their appliances. An obvious choice was a combined gas and coke fire in which the gas fire was an integral part of the appliance, used the same flue, and each component could be used separately or together, as required. An outstanding characteristic of such an appliance was that in practice one never put on to the coke fire the last bucket of coke, but instead of going to bed one lit up the gas fire. A similar appliance in embryo was a coke fire and back boiler with integral gas water heating for summer use. So far attention had been directed to gas and coke although there were many circumstances where gas for all-the-year-round water heating was economic and desirable and some cases, for example, multi-storey flats, where gas might be the choice for the main living room heating and, in this connection, great advances had been made in the production of new convector fires which would represent a gain in practical efficiency of say, 30%.

The combined policy for using gas and coke represented commonsense, satisfaction to the user, conservation of coal, and the extension of smokeless zones. They must appeal, however, to more than the moral sense, or even the legal sense of the public, and he believed that they were already in a position to give them something which they wanted and needed although they might not know it, and, looking ahead to better appliances, their position would become stronger and the appliances they wished them to use would become their inevitable choice.

Question of Nomenclature

Dr. F. J. Eaton (Watson House) said Sections 78 to 84 of the Beaver Report dealt largely with coke quality, and recommendation (10) paragraph 122 was that a British Standard should be prepared. It was, however, not clear what standard of quality the Committee had in mind. The descriptions used were high quality free-burning fuel, improved and consistent quality and superior coke of standard quality. They could not complain too much. They had agreed coke sizes, but nomenclature varied over the country, although the term open fire coke was used in the south. A Committee of Enquiry on Coke Quality set up by the Institution of Gas Engineers reported on coke sizing and on coke properties in November, 1942, and December, 1943, respectively. The recommendations were accepted by the members of the National Federation of Gas Coke Associations, who at that time represented most of the gas undertakings now vested in the area boards. Later in 1948 a confidential report on Coke Quality was prepared and issued by the London and Counties Coke Association and this was revised, re-issued and accepted by the Gas Council in 1952. They were thus already prepared with the specification of coke quality recommended by the Beaver Committee and this could be the basis of a British Standard if considered necessary. One sentence in the introduction to the Coke Quality Report was of special importance. To emphasize it, it was printed in italics and it read: 'It is more important that deliveries of coke should be as constant in quality as possible rather than they should sometimes be of very good quality and sometimes of poor quality.'

Research Results

They had carried out some work on consistency of coke quality. It was one of their research projects and some results were published in a paper he gave to the Institution of Heating and Ventilating Engineers in April, 1953. The figures showed quite a wide spread in reactivity, ash content, sizing, etc., yet as there were practically no complaints of the quality of coke from this plant, the consistency could be taken as satisfactory to the user. It might be that for the country as a whole a different level of quality should apply, and the Gas Council Coke Technical Committee was collecting the necessary data by means of a 'coke quality survey' covering all area boards. No one would claim that all cokes complied with every requirement of the recommended specification, but the defects in existing plant were generally known and could be corrected given time and money.

It was common knowledge that complaints of coke quality rose steeply when a change had to be made in the type of coke supplied and also when coke was delivered from storage. However they altered the reactivity and sizing of horizontal and continuous vertical coke in an effort to produce comparable 'burnability,' they still could not alter the influence of the difference in bulk densities. The ignition of horizontal coke was always slower than that of the continuous vertical coke. Moreover, the householder noticed that the cellar was not so full for the same number of sacks. Something was different and a change for the worse was expected. As some 50% of coke was produced in horizontal retorts and 45% in continuous vertical retorts, where both types were made it might be of advantage to market a mixture rather than provide a complete change of type. The mixing of the two types in the boiler nut size had proved acceptable to the users. On the recovery of coke from storage complaints were generally confined to high breeze content. It was known that an increase in the domestic demand would require increased storage to meet the seasonal winter to summer ratio of 6½:1 as compared with 1½:1 for the industrial market. Mr. D. C. Bertram, in his paper to the London and Southern Section of the Institution in 1952, described how this problem was being tackled at Southall and as a result of that work mobile bagging and debreezing machines were available which produced a coke comparable in sizing and breeze content with that taken from hoppers. The cost in 1952 was given as 14.3d. per ton on a 120 tons per day basis. Tests on the mobile machine showed that a 3 ft. by 5 ft. screen with ⅝ in. apertures would deal with a 35 tons per hour throughput of broken coke containing up to about 25% below ½ in. It was advisable to increase the aperture to ¾ in. if, as sometimes happened, there was a pocket of small sized material to be recovered.

Coke Appliances

On the subject of appliances, recommendation 8 of paragraph 121 read: 'Domestic heating appliances installed in all new premises should be of the approved type,' and the point of appliance approval was amplified in Appendix IX paragraph 4. It should be noted that as far as solid fuel appliances for local authority housing were concerned the approv-

ing authority was a Government Inter-departmental Committee on which the fuel producers were not represented. He was well aware that there was considerable and helpful interchange of information between the gas industry and the Ministry on coke appliances, but such co-operation was informal and could with advantage be regularized; divided responsibility was never completely satisfactory. The type of fuel and the appliances were so inter-related in providing, in combination, a performance satisfactory to the user that a joint appliance approval committee of fuel producers and Ministry was desirable. After all, the gas industry had an appliance approval scheme of many years standing and its test methods and standards of performance formed the basis of the first Ministry test schedules. The industry's Approved Coke-Burning Appliances Handbook was first issued in 1938, and the fifth edition was now in preparation. Why was this not better known, and might he ask Dr. Foxwell why no mention of it was made with the other approved tests in Appendix 18?

Approval of Appliances

In approving appliances the gas industry had always been guided by district experience as well as by laboratory tests. To illustrate the value of district experience he would mention two simple, but important, design features of the open fire. First there was the fire bar air space which for coke burning their experience showed should be $\frac{3}{8} \pm \frac{1}{16}$ in. A fire with $\frac{7}{16}$ in. air spaces would pass the laboratory tests, but would give rise to complaints from the user who seldom took the same care in de-ashing the fire. Again a low fuel capacity fire could under laboratory conditions give the pass efficiency and output figures, yet, in practice, complaints could be received of insufficient heat output. These no doubt appeared very minor points yet he assured members that most of the open fire coke complainants were converted to enthusiasts simply by ensuring two things, (i) that they de-ashed the fire properly and (ii) that the fuel capacity was adequate and the fire was always replenished to full capacity.

The change-over to solid smokeless fuels recommended by the Beaver Committee as a contribution to cleaner air would embrace many users who would prefer to continue to burn coal. Their co-operation and goodwill was essential and the success of the four smokeless zones now in operation indicated that the public would co-operate. There was little doubt that public opinion was now very much in favour of clean air. The incentive was there and he was sure they would do everything they could to help. He would, however, enter a plea for time so that the change-over could be gradual and sure.

Availability of Domestic Gas Coke

Mr. J. O. Cooke (Coke Officer, Gas Council) said that in the smog areas the Beaver Committee called for the replacement of house coal in domestic usages by smokeless fuels, including electricity and gas. It accepted that gas, oil, and electricity would make some contribution, particularly in off-heating season usage, but it recognized that the main substitute for house coal must be solid smokeless fuel. The Report reviewed the possible expansion in production of available solid smokeless fuels and concluded that gas coke must be the main substitute for house coal and that the quantity required should be obtained part by increased production and part by transfer from other markets.

The problems involved in making available these tonnages, which entailed over 10 or 15 years a steady gradual increase in gas coke supplied to the domestic market up to something over 8 mill. tons, were under active consideration by the Gas Council. It would be inopportune to attempt to speculate in any way as to the outcome of those deliberations. The prime purpose of the gas industry was to make and supply gas, and gas coke was not made for itself alone but only as a consequence of gas manufacture. Various types of coke were produced, not all of which were suitable at present for the domestic market. Satisfactory and profitable commercial and industrial markets had been built up for these cokes, and the conditions obtaining in them in the main suited the special conditions appertaining to gas coke manufacture. The domestic market was speculative and exacting.

The pattern of domestic supplies was mainly one of small deliveries at irregular intervals to a large number of consumers. To do this business the gas boards would no doubt use the existing distributive trade as well as their own vehicles, proper consideration being given to the distributors' margins where these were not comparable with those being paid on coal. Some tonnage of cokes of domestic quality would have to be moved inside gas board areas and in extreme cases from board to board—from producing works to points of shortage. In volume coke bulked almost twice as great as coal and freights were high and were likely to be higher. Indeed the tonnage of coke that could be economically moved between boards must be restricted to small marginal quantities if price was to be kept within reason. Essential features of domestic business were the carrying of substantial stocks to meet peak winter demand and the associated problem of sack loading. Large stocking grounds would have to be provided with expensive stocking, reclaiming, and rescreening equipment, all of which would be an additional charge on coke prices.

Consumer Service

On the other hand the gas industry for the main part of its gas business was traditionally concerned with the domestic trade. It maintained a consumer service for gas which it was essential should be provided also for domestic coke business. The gas industry with its network of showrooms was uniquely fitted to do this for its direct business and could also control and assist the independent distributive trade handling coke so as to ensure that merchants' consumers were provided with similar service. It was essential that before embarking on this expansion of the domestic market there should be some assurance that it would be economic to do so.

It would be argued, no doubt with some truth, that the setting up of smokeless zones under present conditions would tend to establish an almost exclusive market for coke in the domestic field. Nevertheless, the obligations of the market were such that a considerable premium over present prices was essential if the industry was to set about catering for the demand. The Beaver Committee indeed visualized some such increase and coupled the increase with the prescription of quality of the coke in a national standard specification. Most important was the fundamental that if the industry was to produce this domestic coke then it must have as a first priority gas coals in the right quantities, in the right qualities, and at the right prices.

The past production of coke and the estimates of future production must not, however, be taken to indicate the maximum quantities which could be produced by the gas industry if a larger quantity of coal were available. In the last annual report of the Gas Council it was stated that in the summer coal programme of 1953 provision was made for the area gas boards to carbonize nearly 1 mill. tons less coal than the boards had estimated that they would require, and later in the same paragraph it was stated that during the winter six months 1953-54 the boards were requested to restrict the quantity of coal carbonized by 568,000 tons below their estimated needs. A much larger tonnage of coal than had been given to the industry in recent years was essential.

Replacing House Coal

Mr. Cooke next turned to the tonnages of coke required to replace house coal in the smog areas—those areas with heavy smoke pollution and with a high population density of 5,000 and over per sq. mile, or in other words, those parts of the country where the number of houses was more than four in an area the size of a football ground. Two assumptions were made in the calculation of the tonnage of coke required in these areas. First that 20% of the existing house coal demand would be taken up by gas and/or oil and/or electricity in off season use. Second, that because of the greater output of useful heat from coke not more than 15 cwt. of coke would be required per ton of house coal.

Coke needed for the Scottish smog areas covering the Clyde, part of Edinburgh, the Falkirk area and a small region in Fife was estimated at 768,000 tons, some 595,000 tons of which would be for the Clyde. Glasgow itself would need 420,000 tons of coke and Edinburgh 133,000. Some 21 local authorities would be concerned with setting up smokeless zones.

In the Northern Gas Board the Tyne and Tees-side areas would need 495,000 tons of coke including 350,000 tons in the Tyne area. Newcastle would call for 101,000 tons of coke and Sunderland 76,000. Eleven local authorities would be concerned in the Tyne area and six on the Tees. This part of the country was heavily industrial and might be one of those which

the Beaver Committee had in mind as being in many respects more suited to 'smoke control areas' than smokeless zones.

The Merseyside and S.E. Lancashire, in the territory of the North Western Gas Board, was one of the two largest smog areas in the country and would ultimately call for 1,625,000 tons of coke. The areas of a population density of over 10,000 persons per square mile accounted for more than two thirds of the tonnage. Manchester needed some 338,000 tons and Liverpool 301,000. Some 43 local authority areas would be involved in establishing the smokeless zones and smoke control areas. In the West Riding area (North Eastern Gas Board), 575,000 tons of coke would be wanted, Leeds requiring 245,000 tons and Bradford 158,000. Nine local authorities were involved.

In the area of the East Midlands Board occurred those smog areas east of the Pennines from Sheffield to Nottingham including at the lower extremity Derby and Burton. Some 442,000 tons of coke were necessary, and 13 local authorities would be concerned. Sheffield would need 120,000 tons of coke and Nottingham 110,000. The Potteries, Birmingham and the Black Country and the Coventry regions were in the area of the West Midlands Gas Board. Some 120,000 tons were needed in the Potteries, 62,000 tons in Coventry and 793,000 in Birmingham and the Black Country. Birmingham alone required some 433,000 tons. Nineteen local authorities would be dealing with smokeless zones or smoke control areas.

London's Coke Requirements

Finally he came to the London area, which had the outstanding feature of a tremendous concentration of population of over 10,000 persons per square mile over the whole of an area measuring 15 miles from North to South and 20 miles from East to West, and of over 25,000 persons per square mile in the inner zone of about ten miles by ten miles. The area was mainly in the territories of the North Thames and South Eastern Gas Boards with a small marginal area under the Eastern Board in the Tottenham district. The coke requirement in London was 1,606,000 tons, and no fewer than 36 local authorities were concerned.

The tonnage of coke needed was disposed between 1,040,000 tons in the North Thames area with 40 local authorities, 470,000 tons in the South Eastern with 21 local authorities, and 96,000 tons in the Eastern with five local authorities. This breakdown of tonnage between the boards was somewhat academic as the domestic business of the gas boards in the London area in most parts overlapped and could not be separated.

There was no need to emphasize the magnitude of the problem, which was fully covered by the Beaver Report. Time would be necessary. Ten or 15 years was the period that had been envisaged as being the least required to complete the change-over. The local authorities each had a tremendous job to undertake. Surveys had to be made of both domestic and industrial usages in their areas. Change-over of appliances had to take place. In the London area the population of the adjacent boroughs of Wandsworth, Camberwell, Lambeth, and Battersea was nearly as big as that of Birmingham or Glasgow, and these areas largely comprised old houses dating back to the beginning of this century, mostly equipped with old fashioned appliances.

The quantities of coke required to replace house coal in many areas were high, but they could be produced by the solid smokeless fuel industries. The production of smokeless fuels selling at economic prices and meeting all the needs of the domestic market could only be effected by a general expansion of coal carbonization by which both gas and coke were produced.

With a properly integrated sales policy gas and coke could meet the needs, provided that coal was made available to the industry in the right quantities, in the right qualities, and at the right prices.

A Welcome Effort

Mr. G. E. Hall (British Coking Industries Association) said the Report constituted a welcome effort to make some decisive impression on the serious problem of smoke pollution. It was a factual document but it provided some most encouraging observations from the point of view of the carbonization industries. The notion that the burning of raw coal, whether in household or factory, was wasteful, was no new one. The protagonists of carbonization had pointed out over many years that carbonized coal offered more than coal merely burnt—not a little more but much more. The Beaver Report forcibly brought home to them that not only were they guilty of being wasteful, but of fouling their nest at the same time. The impact of the Report was the greater because the theme was smoke abatement and not fuel economy. Nobody took kindly to being told to save something which he was quite happy to waste, but he would respond much more readily to an exhortation to clean something up.

The Beaver Committee had wisely recognized that there were a number of industrial processes, among them their own, which were difficult from the point of view of smoke emission. It proposed to deal with the situation by declaring such works scheduled works in the manner of the Alkali Acts, and in fact extending the responsibility of the Alkali Inspectorate to see to it that scheduled works used the best practicable means to minimize smoke emission. This appeared to be an entirely rational way of tackling an admittedly difficult problem, and they might well support it as opposed to the alternative of having local government officials dealing with 'on-the-spot' problems. If the latter assumed this responsibility they would be faced with a multiplicity of requirements differing from place to place.

Concerning household smoke, the Report told them quite clearly—and the conclusion appeared unassailable—that coke must play by far the greater part if they were to have smoke abatement. This conclusion took into account the contribution which could be made by increased use of such fuels as gas and oil, and it allowed for the expanded use of electricity. Dr. Foxwell asked what were they going to do about it? They had heard the comments of colleagues in the gas industry; it was his duty to say something about the plans of the coking industry.

Coking Industry Plans

Coking plants at the present time produced rather more than 17 mill. tons of coke in a year, the greater proportion of which was supplied to blast furnaces and foundries. There were, however, 4½ mill. tons which found their way into other markets—mainly domestic and light industry. It was expected that this quantity would have increased in four years time to nearly 4¾ mill. tons. The greater proportion of this material was in screened sizes and much of it was suitable for household use. It would be appreciated that a proportion of this coke was fairly unreactive, and was made up of the screenings from the metallurgical coke of larger size. There were, however, a number of plants whose whole output was taken up in the domestic and industrial market, and these cokes were much more reactive, in some cases more reactive than an average gas coke. From them they obtained sizes and qualities appropriate for household use, both for the approved open fire and closed appliances. The tonnages of open fire coke and the smaller domestic sizes were being noticeably increased by cutting and re-screening, a practice which was being extended at a number of plants. In short, a good deal of oven coke was available, and the domestic tonnage was increasing and would continue to increase.

Regarding quality, the position was somewhat as follows. In the coking industry they had a very wide range of coke types, varying from the dense unreactive foundry cokes to the very much less dense and often highly reactive domestic cokes. The principle was established of marketing the coke for the job. Reactivity was of primary importance in so far as the open fire was concerned—perhaps less so in the case of the closed appliance. A dense fuel had an advantage in economical storage and in banking for long periods. The coking industry manufactured cokes of all types, and by careful sizing was endeavouring to ensure that the customer received the appropriate coke for his particular usage.

Importance of Coal Cleaning

Dr. R. Lessing (Member of the Beaver Committee) said they heard a good deal in the Committee, particularly from people in the north, about coke being regarded as coal from which the goodness had been taken out. They were not entirely wrong in their general appreciation of the kind of fuel they were being offered, except in their scientific explanation. It

was not that the goodness had been taken out, but that much of the badness had been left in the coke that gave it a bad name. He referred to the mineral matter in the coal that was being used to make coke.

Experiments at Tottenham

As one of the senior members of the Section and the former Southern Association he claimed the privilege of anecdotage, and recalled that in 1930 he submitted a paper to the Institution of Gas Engineers recording large scale experiments carried out at the Tottenham works with which the present Chairman of the Section was now associated—experiments with which Sir Harold Smith, now Chairman of the Gas Council, was closely associated. The object was to prove the theory that the cleaning of coal showed benefits in many directions. A consignment of 1,000 tons of Yorkshire coal forming a normal delivery to Tottenham in those days was split in half, one half being sent to the vertical retort settings and the other half being sent to Wales where, in a cleaning plant, the ash content was reduced from 9-10% to about 1%. Quite apart from the effects of the lower ash content it was found that the throughput of the retorts was greatly enhanced. The actual figures were on record in the Institution Transactions for that year. The throughput was greatly increased and the release of gas by reason of the coal being de-dusted was vastly increased. It was calculated that the capacity of the existing plant could be increased by something like 25%—a matter which had an important bearing on present proposals for increasing total tonnage capacity without having to incur heavy capital charges for the extra plant required. The coke had an average ash content of 3%, with about 3.1% to 3.2% for breeze. Having removed all extraneous mineral matter they had only to deal with the inherent ash in the coal.

The resultant coke was tested at the Fuel Research Station and showed definite advantages over that from the uncleaned coal. If similar tests could be carried out today it would be shown that coke was not coal from which all the goodness had been taken out.

In the Tottenham tests the coke was also used in water gas manufacture in some of the smaller works belonging to the Tottenham Company at the time, and it was found that the ash problem was almost entirely solved. Clinkering was necessary every eight hours against every two hours previously, and gas generation in the producers was vastly increased, and the plant worked altogether much more smoothly.

He suggested that the time had come when there should be more co-ordination between the fuel industries on the question of allocating to each industry the coals most suited to it in the national interest. Both the gas and electricity industries should endeavour to obtain the most suitable coals for their respective purposes. He mentioned electricity because of the sulphur content. Coke which was used in domestic appliances by the domestic consumer, like that used by the industrial consumer, still contained sulphur which polluted the atmosphere with sulphur dioxide. Although the Beaver Committee recognized that there could not be 100% purity, every 1% by which sulphur was reduced would be to the public good.

The elimination of the offending matter in coal—which was not entirely mineral but always contained a considerable amount of combustible carbonaceous shale—should not necessarily result in raising the price of coal. The cost of cleaning, provided the discarded material was utilized at the colliery, should be negligible.

Preference for Open Fire

Mr. W. Morland Fox (W. J. Jenkins & Co., Ltd.) said it was evident that the cheapest domestic method of burning fuel was in the closed openable stove, which had a wide flexibility. He detected a note of dissention among members of the Beaver Committee on the specification for solid smokeless fuel, coke. Surely the Beaver Committee, Watson House, and the appliance makers should concentrate their efforts on the production of a cheap closed or openable stove as the best method of dealing with all the solid smokeless fuels available.

Mr. C. A. Deas (Coke Officer, Eastern Gas Board) said coke quality did not entirely depend on getting the right kind of coal. Bad sizing and excessive breeze content were two important factors, and in times of peak demand nothing was worse than having to deliver coke consignments lacking in consistency of quality. Something must be done about coke preparation and loading. If they were going to cultivate the domestic coke market they would have to prepare more coke at the gasworks. There were only certain tonnages of raw coal available and there did not seem to be much prospect of a large increase. They had to decide how much of that raw coal was to be used in its raw state, and how much was to be processed in the gas industry or used in the electricity industry. The Beaver Report presented a wonderful opportunity for the industry. The door was wide open, but he thought they had to make haste slowly, because in that way they were most likely to attain their ultimate goal.

Dr. Eaton, replying to Mr. Morland Fox, said he did not know why the openable stove was not as popular as it should be. It was a much higher efficiency appliance, but the public had never accepted it up to the present time. There was a possibility of getting it into the high blocks of flats now being erected, because the method of flueing might need that type of appliance. The L.C.C. were going ahead with it and were putting up experimental installations. One disadvantage was that an openable stove cost something like £13 or £14, whereas an open fire cost as little as £5. Where appliances were put in by local authorities or private builders they went for something that was going to keep expenditure down, and they therefore went for the cheap article.

Only Limited Compulsion

Dr. Foxwell, winding up the discussion, said what they had to consider was that the domestic consumers all over the country, and more particularly in the north and the Midlands, had expressed a preference for the open fire, and no Member of Parliament had gone so far as to say he must not have an open fire. No Government would agree to any compulsion as to what fuel a consumer should use, or in what appliance he should use it; it would go only so far as to say what he must not use—namely, a fuel containing more than 20% volatile matter. The choice in other respects rested solely with the consumer. It had been the policy of the Government to say that gas, electricity, and raw coal were in competition. It was up to the gas industry to persuade local authorities first, and then the tenants and the owners of property, and particularly the users, that they should use gas and, in the case of closed appliances, coke. He believed that in the course of another generation, if they made the effort, they could persuade people to use closed stoves and thus save the country and themselves a lot of trouble and expense.

He could quote many examples of people whom he knew in his youth who would not then have anything but an open coal fire but who had nothing but gas in their homes today. The question for the gas industry to solve was how it was going to provide the smokeless fuel that people wanted for their open fires. The prospects were that local authorities would prescribe smokeless zones and smoke control areas. Before they could do that there would have to be a certain amount of local option, and some people would dissent. There was a considerable need for propaganda, and they had to put their efforts into persuading people to support the clean air policy. Here was the gas industry's opportunity. The gas industry was saved in the first place by the Welsbach mantle in 1920; in the 1950's it would be saved by the Air Pollution Report.

Mr. C. Stott (Deputy Chief Engineer, South Eastern Gas Board), in proposing a vote of thanks to Dr. Foxwell for opening the discussion, suggested that the best they could do was to seek to increase the use of gas. However good coke might be there remained the task of taking it up several floors to individual homes in London's newest block of flats, followed by the visit of the dustman to take away the ashes. The real solution of the pollution problem lay in the proper development of the manufacture and distribution of gas. With coke they were solving part of the pollution problem, the less dangerous part. There would remain the question of sulphur, and they would continue to put sulphur in the air so long as they burned coke.

Mr. Morland Fox seconded the vote of thanks, and coupled with it the Chairman of the Section and those who had supported Dr. Foxwell in the discussion.

Production and Utilization of Coke*

By W. A. INESON,

Group Chemist, Bradford Group, North Eastern Gas Board.

GOVERNMENT action may or may not be taken to implement the report of the Beaver Committee on Air Pollution, either in part or in its entirety, but the gas industry is concerned with its recommendations, and particularly with that which says: 'Seeing that initially we look to coke as the main solution (of atmospheric pollution), we must make clear that when we speak of coke we mean a high-quality free-burning fuel that will be completely satisfactory to the domestic consumer when used in modern appliances. We have seen areas where such coke is produced and used with full satisfaction. A great deal of the coke now produced is not of this quality. We recommend, therefore, that the British Standards Institution should prepare a specification of quality and methods of testing coke, and that the gas boards should comply with these standards.'

If the Government accepts the recommendations of the Beaver Report and legislation is effected, the gas industry will be concerned with various problems, of which the following are of immediate concern: (1) The production of coke to the quality and standard envisaged in the report; (2) the availability of the required amount of fuel; and (3) the revenue to be derived from its sale.

Production of Coke of Required Quality

The Gas Regulation Act, 1920, established a standard of quality for the supply of gas which the industry has maintained with increasing efficiency. The maintenance of similar values for gas coke is now necessary if satisfactory markets are to be obtained and retained, and other obligations met. These standards must be considered as working operational standards, to be rigorously observed. The quality of gas coke, unlike that of gas, is not wholly within the control of the producer, part being a function of coal quality, but this aspect of the problem is constantly receiving the attention of the industry and of the National Coal Board.

Many properties comprising coke quality are within the control of the coke producer, and certain standards developed from the recommendations of sizing made by the Institution of Gas Engineers in 1941, have formed the basis for considerable research work in the development of coke-burning appliances which will give the required heat output at high efficiency and yet be aesthetic and acceptable to the public.

Coke, however produced, consists of a varying mixture of sizes, and if interavailability of coke supplies is to be made possible, either within the area of the producing board or nationally, then within limits size and quality must be controlled to give reasonable uniformity. The present accepted standards of size, for which all modern appliances—both industrial and domestic—have been designed, have been modified only from the original I.G.E. standards in regard to sizing within the nominal range.

Standard and Constant Size

The supply of a standard and constant size of coke to the consumer can only be maintained by strict attention to the operation of the screening plant and by constant and regular size analysis of the screened product. The proportion of individual grades and of breeze may vary considerably with the type of carbonizing and handling plant, and while in the past large coke was sold at a premium, since today all grades command the same price the function of screening and sizing is to ensure that the customer receives the correct-sized material for his appliance. Screen and plant design and operation should be directed to prevent undue drops and changes in direction of flow, while hopper breakages may be minimized, particularly in the No. 1 grade, by the use of special chutes, and the debreezing of all grades by breeze mats or guard screens is an essential to good practice. As there is no absolute standard size of screen aperture to provide the required grade, this must generally be determined by trial and error to suit local requirements, with strict attention to the effect of wear and tear, and loading of both major and debreezing screens. Regular size analyses will indicate screen performance and the variability of the feed, since while the grade may conform to the nominal size, the range within the size may vary considerably, depending on coal and retort house practice. Although nominal sizes only are specified, the tolerance of modern appliances is generally sufficient to cope with considerable variations within the range; information on this is nevertheless valuable.

Although it may not be practicable to earmark certain coals and plant to supply the domestic market, coal allocation and direction should be made with this in mind. With the possibility of coke deliveries being made from more than one source, an attempt to supply to a minimum C.A.B. or volatile therm content should be made in order to prevent complaints. Increased combustibility may be obtained by slight modification of carbonizing practice, but as it may be difficult to attribute any direct increase in coke sales to improvement of this property, the small reduction in gas yield may be considered not to justify this modification. Other methods of increasing combustibility, such as the addition of inorganic salts, may not be considered advisable. In regard to water content, which is controllable, standard ranges have been established, and since 'too-dry' coke is as unsatisfactory as 'too-wet' coke, regular and adequate examination must be made of all coke sold.

Coke Quality Control

All works of reasonable size should operate a system of coke quality control incorporating size analysis, determination of water and C.A.B. values, as well as observations of the fire performance of coke when examined under standard conditions. This is fundamentally the foundation of the work of a coke officer, and his work cannot succeed unless assured of adequate, consistent and reliable grades of all gas coke. He is assisted by the degree of appreciation of his difficulties by the works staff, and while the plant designer and constructional engineer do much to facilitate the production of coke of good quality, the seal on this work is set by the production staff, from the works manager downwards.

Coke production and preparation must be so ordered that the demand for sized gas coke may be met, to permit of its general use as the national smokeless fuel. This demand may require slight modification of the present sizes ranges sold, but both laboratory and practical fire performance tests should be undertaken locally before a radical change is made from present standard sizes. Additional coke may be made available by the more efficient operation of the producer plant. A saving of 10 lb. of coke per ton of coal carbonized would make available for sale an extra 4,000 tons of coke for each million tons of coal used on the works.

Revenue from Sale of Coke

Revenue from the sale of coke and the price of gas are inter-related. It is therefore in all interests that coke quality should be such that it can command a selling price as a specialized fuel. This is very necessary if the domestic market is to be developed, perhaps at the expense of other markets, since it does not at present prices yield as high a return, particularly where deliveries are made directly by the producer.

Of the many problems of coke production and plant design, which affect quality, the question of coke stocking is

* From a paper presented to the Yorkshire Junior Gas Association at Harrogate, on January 15, 1955, under the title, 'Coke—the Smokeless Fuel.'

not the least, and it is a matter of controversy whether scalped or unscalped coke—*i.e.*, coke above ¼ in. should be stocked. Local circumstances may determine the method adopted and the grades required for sale, but since stocks will have to be held in summer for winter demand, all coke taken from stock should be re-screened and de-breezed before sale.

Coke and breeze can be burnt efficiently and satisfactorily only by the use of specifically designed appliances, and in the sale of these appliances due regard must be given to their fuel requirements relative to the quantity of each grade normally produced. Broadly speaking, the standards for these appliances are easy installation, minimum labour and maintenance costs, and high working efficiency combined with simple control.

Domestic Utilization

Desirable standards for domestic appliances have been formulated to give optimum performance with the grades of coke most easily produced. Standards are not wholly concerned with efficiency, as output is of equal importance, and in regard to the open fire, a 16 in. model with a thermal efficiency of 30/35% should be capable of heating a room of about 1,750 cu.ft. at an output of 7,500 B.Th.U. per hour. Many fires marketed in the last few years, and which attempt to burn either coal or coke, are not satisfactory in regard to ash clearance and output when using coke, due to the use of the minimum air spacing between bars, although it is now possible with some fires to obtain grates having either narrow or wide spacing. For satisfactory performance on coke, the air spacing should be ⅝ in., when simple adjustment of the control damper will enable combustion rates varying from 0.7 to 2½ lb. per hour to be obtained.

Coke or coke with coal can be ignited without gas ignition, but the integral gas burner is essential to satisfactory performance, as well as for its gas load. The cost of installing the fire can be considerably reduced by its omission.

Grate life varies considerably, due generally to lack of ash clearance, but ramping the hearth to give greater ash space at the back, with the elimination of the box pan, offers one satisfactory solution, while grates of special composition offer other alternatives. Most domestic appliances are designed and produced to laboratory standards, but a field survey of their performance would assist materially in future design and in the reduction of present maintenance costs. Inset open fires are prone to give air changes beyond those necessary or desirable; this may be controlled by the fitting of throat restrictors, reducing the flue area to about 15 to 20 sq. in., improving both fuel consumption and comfort. By the use of flue restrictors the size of room capable of being heated by a 16 in. fire is increased to about 2,000 cu.ft.

Hot Water Appliances

Hot water may be provided by fireback boiler or separate unit. The separate boiler unit is the more efficient appliance —55/65% compared with 45/50%—but its use requires the maintenance of two fires, and storage may be needed for two sizes of coke. The distribution of output between space heating and hot water from a fireback boiler is 20/23% and 25/27%, compared with an overall radiation efficiency without boiler of only 30/35%, and improvement both of design and setting is needed. Installation is important, incorrect setting of the boiler, which should be 1½ in. above the grate, reducing hot water production. Certain types of boiler have been designed to give both hot water and low temperature radiation, and where difficulty is experienced in obtaining a satisfactory balance between the two demands, a thermostat control said to give selection in favour of hot water is now being field tested.

The use of the fireback boiler is more common in the north, and is always of copper in soft-water districts. When of copper and used in conjunction with coke, its life is often reputed to be considerably shorter than when using coal. Research in recent years suggests that boiler failure is generally due to metal wastage caused by alternate oxidation and reduction conditions, in conjunction with the presence of moisture and acid salts. The life of the boiler is affected by its location in the appliance and by the method of boiler-sealing, and while complaints have not been confined to one type of appliance, openable stoves appear to be most affected. Failure has generally occurred in the face next to the fuel bed and in the direct path of the products of combustion. In certain circumstances the flue gases may be responsible, but as they are beyond control and common to all appliances, the remedy must lie elsewhere, since similar types of appliance and boiler are often unaffected. Modification of appliance design in affected cases, particularly in regard to boiler location, or alternatively the fabrication of the boiler from materials other than copper, may be the remedy. Recently a boiler of copper-clad steel has been provided for the Radiation Group with very satisfactory results. The results of a local survey of some 600 open-fires with fireback boiler is awaited, the installations being about equally divided between boilers of the two materials.

While the foregoing represent the more common domestic coke-burning appliances, there are other units which merit increased popularity:

(*a*) Ordinary open fires with large back boiler units for providing low temperature radiation by hot water, in addition to space-heating and domestic hot water.

(*b*) Boiler flue unit.—A number of self-contained units are available, but these generally do not operate as well as the fireback setting and are more sensitive to change in coke quality.

(*c*) Convector open fire.—A self-contained unit, with or without back boiler, has a combined radiation and convection efficiency of over 50% and may be used for supplying warm air either to upper or ground floor rooms, in addition to normal radiation.

(*d*) Convector fire (down draught) with boiler. Units of this type work on the down draught principle, and provide hot water and some low temperature radiation.

(*e*) Openable stove.—These stoves are all self-contained, and are available with or without boiler in free standing or inset types. The boiler unit, at 50%, has a 10% higher efficiency, and all units which incorporate a shaking grate can be banked on No. 2 coke for about 10 hours.

(*f*) Free standing cookers, which use No. 2 coke, are of two general types—the heavily insulated heat storage unit, and the insulated cooker of lighter construction.

Industrial Appliances

In the industrial and quasi-industrial field many appliances designed to burn either coke or breeze are available, and provide, without smoke, practically all industrial and commercial requirements for hot water, steam, hot air, and other heat services. Fuel efficiency has been increased by the general adoption of automatic control, either of draught air admission or heat demand, while certain types are completely automatic and incorporate additional arrangements for labourless clinkering and re-fuelling.

Practically all types employ fan air, but where breeze is used, the fines below ¼ in. may cause difficulties from carry-over unless the combustion rate is reduced by some 30/40%. The elimination of the fines below ¼ in. or ¼ in. would provide a satisfactory fuel for such an appliance, but whether this is practical and economically sound is debatable, unless a reasonable and enhanced price can be obtained, and the disposal of the fines assured.

Industrial and quasi-industrial appliances can broadly be divided into three groups:

(*a*) Pre-burner unit for low pressure steam and hot-water production, process work and/or central heating.

(*b*) Semi-producer units for drying of grain, cereals and similar material, tiles and even for bread-making.

(*c*) Normal mechanical and semi-mechanical grates for similar duties to those outlined for the pre-burner unit.

In the pre-burner unit combustion occurs completely before the products enter the heat exchanger or nominal boiler. The type of unit has been developed to provide an efficient alternative to the underfeed stoker, which is not completely satisfactory on coke, due to high maintenance costs because of abrasive action. These units, having no moving parts, require little maintenance, and are very efficient, particularly when attached to a heat exchanger of the Bouellat type, although satisfactory results are obtained when fitted to existing hand-fired sectional units. There are two main types of pre-burner unit, both of which have gravity fuel feed, but they differ in the method of air admission and in the size of fuel required.

The Copperad and Suxe units are suitable for fuels up to about 1¼ in. in size, and are operating locally on No. 4 nuts, and on breeze containing 18/25% below ¼ in. Primary air

in the Copperad enters each side of the combustion chamber above the fire, but in the Suxe it passes from below the fuel bed through a series of pre-set valves to ensure even distribution. In both cases the burner is water jacketed, increasing heat recovery, which is about 75/80%. The burners are thermostatically controlled, and by means of a kindling device operating five minues every hour no difficulty is experienced in maintaining overnight burning at low outputs. Labour depends on hopper size, but fuelling and clinkering are simple, and a recent installation at a communal centre is operated by local pensioners.

The fusion temperature of the ash is of some importance, and requires to be about 1,200°C. Units rated at from 300,000 to 1,200,000 B.Th.U. per hour are available.

The Downjet, or Magnacalor unit, operates best on No. 2 coke, preferably 1½ in. to 2 in. Two types are available, one with water-jacketed fire box, and the other with refractory material, this unit being used for industrial purposes other than water heating. Fuel is gravity fed; air at 12 in. to 14 in. W.G. is discharged through a nozzle which impinges on the upper surface of the bed, penetrating to a depth of several fuel particles. The fuel is reduced in size by passage downward, the main combustion occurring 2 in. to 3 in. below the upper layer, which acts an an air pre-heater and filter removing fly-ash, though silicane has been found in the products. Clinker in the form of hard pads may be mechanically removed, while power requirements vary from ½-¾ to 3½-4 h.p. for units burning 50 to 350 lb. of coke per hour.

Semi-Producer Units

The semi-producer furnace, designed originally to compete with oil for grass-drying, provides a relatively new type of industrial coke-burning appliance. Although operating on solid fuel, it has many of the advantages of gas firing, and is an adaptation of the step grate producer, with which works personnel are familiar. The unit is of flexible design, and local requirements determine the hopper feed arrangements and general construction. No. 1 coke is used, the combustion products being diluted with air and used directly for temperatures up to 1,200°C., or indirectly through an air or other heat exchanger, though this method is relatively inefficient. Furnaces of this type are being used for many processes: a continuous reel oven for bread-making has now passed the prototype stage, while other successful applications include drying processes for tiles, various crops, grass, grain, etc., and clay and lime processing.

The more usual applications of coke and breeze for industrial purposes comprise steam raising and hot water production in hand or mechanically-fired units. The Oldbury chain grate stoker for shell-type boiler using either No. 4 coke or breeze is well known, and the use of grate-type dampers instead of the normal slide gives very delicate control and improved efficiency, particularly where shut-down periods occur.

For large-scale central heating a new appliance, the 'Trianco' boiler, available in units of 500,000 and 1 mill. B.Th.U. per hour, has an efficiency of about 80% when operating on No. 3 coke, largely due to a well-designed heat exchanger unit.

The operation of fuel delivery, clinkering by ram working to a pre-set period, its crushing by simple roll crusher and removal by elevator, are completely automatic, but all these refinements are justified only for large installations, and for this reason the boiler is also available without fuel and crushed clinker elevators.

For quasi-industrial requirements of space-heating and hot water, the Janitor Cokette gravity feed boiler, available in units of 55,000 to 145,000 B.Th.U. per hour, works very satisfactorily on No. 3 or No. 4 coke for periods of up to six or eight hours without attention, provided the ash content of the coke does not exceed 12%. As there is no bar, the fire is supported by clinker, which is removed as a pad. The boiler works at high efficiency by natural draught, and combustion control is by an electro-magnetic damper governing primary air admission. The damper operates at 24 volts, and is actuated by the boiler thermostat.

The contribution which can be made by the use of gas coke towards a cleaner atmosphere, irrespective of the stimulus provided by the Beaver Report and by the present public appreciation of its importance, can only be realized to the full by continual research directed towards the production of a still better coke, and to the further improvement in appliance design, accompanied by the education of the community in the correct use of the present most satisfactory smokeless fuel, gas coke.

DISCUSSION

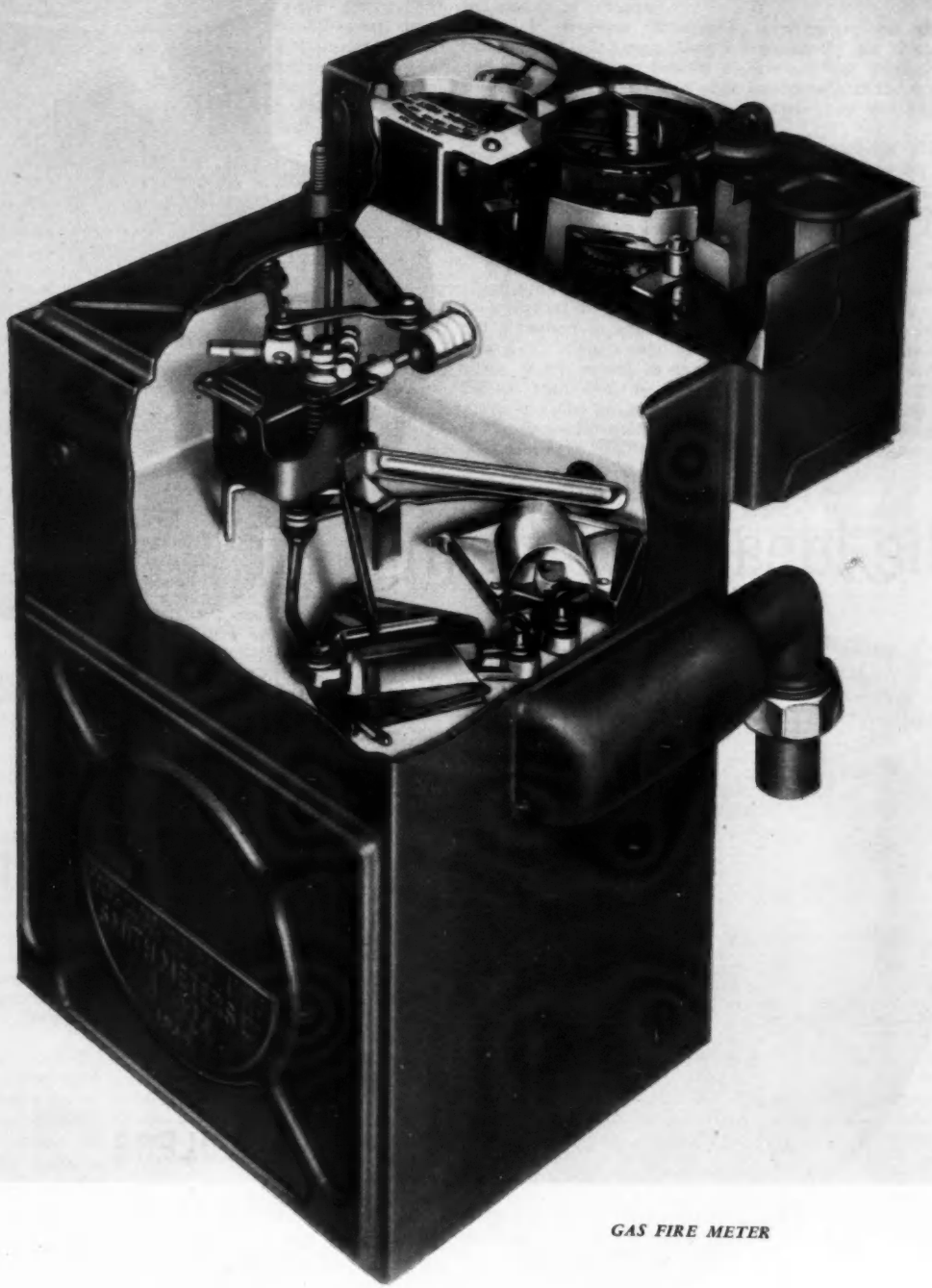
Mr. D. C. Henderson, President of the Yorkshire Juniors, presided, and Mr. N. C. Sturrock, Group General Manager, Harrogate, supported Mr. Ineson. Mr. Henderson welcomed the valiant company who had braved the elements and gave an especial welcome to a number of coke officers who were present—another compliment to Mr. Ineson. After complimenting the author on his comprehensive, interesting, and instructive paper, Mr. Henderson said the present day coke fire was sometimes regarded by householders as too efficient, because coke in some grates generated such heat that they sometimes had to run off hot water down the sink. He asked if boiler deterioration was due to high temperatures and if the author thought copper boilers were necessary.

Mr. Ineson agreed that coke fires and stoves were often operated at too high temperatures, with the result that copper boilers suffered from excessive oxidation.

Mr. D. G. Wilson (Coke Officer, North Eastern Gas Board) supported Mr. Ineson's plea for uniformity in sizing and grading and improvement in coke quality. He referred to Mr. Ineson's remarks that domestic deliveries might not be as remunerative as sales into other markets, but stressed that all coke business undertaken by the Board must give an economic return. Turning to appliances, he mentioned the importance of the new convector fires which were now being introduced. These represented a half-way stage between the open fire and the coke stove and had many of the advantages of both. Regarding pre-burner units, he said that the Board was conscious of the need to provide adequate supplies of fuel for these appliances. He concluded by referring to the Clean Air Bill which sought to put into effect certain recommendations of the Beaver Report, and thought that if the report was implemented even to the extent of 50% a new future would open up in coke marketing which the industry must be ready to face.

Mr. F. Firth (Leeds), said they had heard a lot about progress in the marketing of a suitable product to meet the demand of consumers, but leaving out users of closed stoves, where the margin between good and poor quality coke was not very important owing to the efficiency of the stove itself, they got back to the consumer using the open fire, who must be supplied with a fuel which was clean, free from 'fliers,' and was easily ignitable. He did not think the gas industry to date, even after the processing mentioned by Mr. Ineson, had faced up to the fact that a smokeless fuel, competitive in its characteristics to coal, would have to be produced if all the talk of smokeless zones, with or without compulsion, was not to become a farce. They had to start with producing coke for the special demands of the open fire, and gas yield would be secondary to the object of producing a domestic coke. This might hurt the 'one fuel' enthusiasts but, leaving out economics, although he was confident the 'two fuel' policy offered the biggest reward, it was only logical that if smokeless zones were instituted and the gas industry enjoyed a monopoly in the supply of fuel it must shoulder the responsibility of supplying a suitable fuel which was both efficient and satisfactory.

It was known that certain coals which had a high oxygen content, or produced a high liquor yield on carbonization, gave a coke under normal carbonizing practice using high temperatures which was equal in its ignitability to low temperature coke, but unfortunately some of these coals had a high ash content and also gave only a moderate thermal yield, but ash content was not an insuperable difficulty. To deal with the problem it would be necessary to earmark a portion of the carbonizing plant for the carbonization of these special coals only and, fortunately, continuous verticals were ideal for the purpose as they also produced a coke which has a low bulk density—another factor favourable to ignitability. Then dry quenching with steam guaranteed the annealing of the coke and irrespective of its ash or shale content it would burn silently without 'fliers'. Where water sprays were used at the bottom of the continuous vertical retorts there was the danger of shock cooling which was responsible



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for creating tensions in the coke and shale resulting in noisy combustion and 'fliers' when burned in the open grate.

Another suggestion which he thought had never got beyond the experimental stage was coating coke with coal dust (as suggested in a paper by Lloyd Bell and Hodsman, 1933). Leaving the subject of coke for domestic fires, there was another field which warranted attention—boiler practice. Here it was up to the gasworks to experiment with their own boilers and realize that the recognized procedure with coal firing—*i.e.*, moving grates and other methods, need not necessarily be the best to adopt when using coke, and some original thinking might be good for the industry.

Mr. Ineson, replying, said he was pleased to hear that Mr. Firth agreed on the need for the production and marketing of coke of consistent and good quality. In regard to the question of 'fliers' in open fire coke it was believed that cooled coke as distinct from quenched coke would exhibit explosive tendencies after it had been exposed to the weather for some time.

Mr. O. G. A. Hofmann (Harrogate) put in a plea for staffs at all gas offices and showrooms to be thoroughly well informed and able to answer all enquiries about the grades of coke and their suitability for various fire grates and gadgets. Even the delivery men should know all about the value and suitability of the various grades.

Mr. Ineson said that too much publicity could not be given through whatever medium was available concerning the correct technique and size of coke required to give satisfaction to the consumer.

Mr. A. Wilkinson (Huddersfield) made the point that if they were going to push the sale of coke for domestic fires they would need to look into the matter of deliveries of small quantities and persuade people that it would burn. He quoted the case of a place with 40,000 houses where at present perhaps they had less than 1,000 coke consumers. 'If', he said, 'you push the sale of coke and get half or three-quarters of the others burning coke you are going to have difficulty in supplying them'. Mr. Wilkinson mentioned that there were times now when customers had to wait five days or more for coke to be delivered and in rough hard weather there were extra transport difficulties. Customers, he said, had often been told: 'We have plenty of coke but we haven't transport'. There was still a lot to be done on the marketing side to ensure that the public got what they wanted and what suited their purpose. It might be necessary to reduce shipments abroad.

Mr. Ineson said that if a good home market was established for coke every effort should be made to ensure continuous supply to the requirements of the consumer, and in principle the home market should not become secondary to transitory demands from abroad. In all circumstances our endeavours should be directed to making a coke of good and consistent quality and to seeing that the consumer received it as and when required.

Mr. Wilson assured Mr. Wilkinson that if there was a sufficient demand for coke from home consumers they would be glad to switch supplies from export.

Mr. Broome (Wakefield) also emphasized the need for coke of uniform quality. He said that very careful steps should be taken to ensure that coke taken from various points within the Board's area should all be of the same good quality, and there should be uniformity of delivery to both producing and non-producing areas.

Mr. Ineson agreed, and said the variability of coke was a great disadvantage, and cokes of different origin should be capable of use on any appliance. Some standard of combustibility should be established to make certain that size and other properties of coke quality were satisfactory. In addition, all gas boards should be prepared to give individual tuition and otherwise educate the consumer in the correct use of coke after delivery of the right size.

Mr. Hargreaves (Leeds) said that in the discussion frequent use had been made of the expression 'if the price is right'. He considered that in pushing the sale of coke they would have to overcome a rather formidable prejudice by the public who still thought that coke was a by-product or a waste product. Such people could not understand why coke should cost more than coal. If the price of coke could be got down per ton to that of coal, said Mr. Hargreaves, they would have no coke for export from this country. He suggested that if they were going in seriously for coke marketing the industry should no longer be referred to as 'the gas industry' but 'the gas and coke industry'.

Mr. F. Roberts (Bradford), referring to the giving of information to housing estate tenants on the use of appliances and coke, said that tenants on corporation housing estates were often here today and gone tomorrow and the first tenant of a house received some information and the party who followed got none.

Mr. B. Place (Leeds) referred to the pioneering work done by the old Gas Light and Coke Company, and **Mr. Ineson** said he was glad to hear that mentioned. He thought the industry owed a debt of gratitude to the pioneer work of the London and Counties Coke Association and it was up to the North to emulate the good work instigated by the South.

A general discussion followed in which **Mr. C. A. Newham** (Bradford), **Mr. H. Dearnley** (Leeds) and **Mr. A. Higgs** (Leeds) took part on the use of flue restrictors, particularly in regard to the reduction in excess ventilation and improvement in fuel economy. Others who took part in a lively discussion on other points raised in the paper were **Mr. Bedwell** (Coke Officer, Hull) and **Mr. E. S. Carter** (Huddersfield). To almost every question or comment Mr. Ineson had a ready reply.

Mr. Dearnley moved a vote of thanks to Mr. Ineson, and **Mr. Hofmann** thanked Mr. Sturrock for affording facilities for the meeting and for hospitality.

Mr. Sturrock, replying, said it was always a pleasure to have the Yorkshire Juniors to meet at Harrogate and after further supplementing the Chairman's commendation, compliments and thanks to Mr. Ineson, said he was sure the North Eastern Gas Board was out to do a job with its coke marketing scheme.

GAS PROGRESS IN NEW ZEALAND

The Auckland Gas Company (New Zealand) serves a population of over 300,000, more than one-seventh of the total population of New Zealand, in the Auckland Metropolitan Area. At the annual general meeting of the Company in 1954, the Chairman, Sir James H. Gunson, said that a policy involving new gas-making plant was adopted in 1947. Satisfactory progress had been made. 'Our Glover-West gas-making plant has proved to be the salvation of the Company—otherwise we would not be here today,' he continued. He was informed that the economic results in this plant were second to none in the world. The figures for the Auckland works have been consistent over the past five years at 97.93 therms per ton.

We are informed that gas is made in the verticals at about 470 B.Th.U. per cu. ft. diluted to 450 B.Th.U. per cu.ft. with producer gas. A very wide variety of coal is used with an average proximate analysis: moisture 2%, combustible volatile matter 37%, fixed carbon 55%, ash 6%. The carbonizing plant consists of 64 Glover-West continuous vertical retorts, 50 in. major axis, of which 48 retorts are now in operation.

The Chairman referred to unfair competition from the electricity industry, particularly the operations of the power boards. The Minister of Hydro-Electricity had written to all power boards asking them to adjust their price schedules in a spirit of co-operation with the gas industry. These representations had been practically ignored, but in spite of that, the gas industry, and particularly the Auckland Company, was holding its own among both domestic and industrial consumers.

THREE COMPANIES are participants in a newly-signed provisional agreement for construction of a 400 mill. dollars natural gas pipeline to run from the Peace River district of British Columbia and Alberta to the United States. West Coast Transmission, Pacific North-West Pipeline Corporation, and the El Paso Natural Gas Co., are the three companies involved in the contract, which requires 300 mill. cu.ft. of gas daily. British Columbia and Seattle, Washington, and other United States cities directly to the south would be supplied. The excess would go to the Californian market. Gas supplies might be reaching the United States border, near Vancouver, by the end of 1956, construction work probably commencing in September, 1955. Mr. Bennett, Premier of British Columbia, made the announcement.

Charing Cross has its third Fuel Exhibition

Right: *Part of the exhibition with, in the foreground, an example of an openable stove in contemporary design and shown in a nursery setting.*

Owing to the indisposition of the Minister, it was Mr. Joynson-Hicks, Parliamentary Secretary to the Ministry of Fuel and Power, who opened the Fuel Efficiency and Smoke Abatement Exhibition at Charing Cross Underground Station on February 1. As he rightly remarked, the exhibition is being held at a very appropriate moment, following closely on the presentation of the Beaver Report, which has caught the public imagination in no uncertain fashion.

The battle against smog, he said, had already started and initiative had been taken by some local authorities in creating smokeless housing estates to the general satisfaction of tenants. The Borough of Holborn last month launched a clean air drive; and this month the Borough of Woolwich was advancing on the same front. But the war must be waged with modern weapons, and in this exhibition they could see some of the latest weapons in the anti-smog armoury. To get the best out of these latest weapons it was necessary to know the weapon drill. The exhibition helped to teach this and he hoped that many new recruits would pass through the Charing Cross training school in the next fortnight.

The Open Fire Reprieved

Some people, he continued, were afraid that smokeless fuel meant the end of the open fire. This was not so—in fact one could not imagine a truly British home without an open fire. Here could be seen many ways in which an open fire could be enjoyed without being a nuisance to neighbours by creating smoke. In the long run—and not so long either—these new appliances saved money, because they burned solid fuel more efficiently. It was true that their price was more than the old-fashioned grates, but to give the same degree of comfort they burned less fuel, and with the present cost of fuel that saving was a very real consideration.

Personally he welcomed every bit of help they could get with the campaign against air pollution and they (the Government) would see that the campaign did not fail for lack of ammunition—smokeless fuel. He was confident that the ammunition would be there when it was wanted. Already more smokeless fuels were being used, and the gas industry's development plans would provide increased supplies of coke; they would be aided by new techniques now being proved. The National Coal Board was working to increase the production of anthracite and phurnacite, and the makers of low-temperature carbonization fuel would likewise expand their output to meet the growing demand. Electricity, gas and oil were all helping, and between them all there was a great variety of ways that people could be warmed without filling the atmosphere with dirt and smoke.

Emphasis on Oil

This exhibition showed what solid smokeless fuels could do to help beat air pollution. But gas and electricity themselves had a no less solid contribution to make to the clean air campaign. Oil too, must be enlisted in the fight. There was a great future for oil in central heating. Not only was it an efficient and economical form of central heating, but by using oil in place of coke, supplies of coke could be released for use in the smokeless zones which would be the first objectives of the campaign.

It was this last point which prompted Mr. H. F. H. Jones, Chairman of the Solid Smokeless Fuels Federation (and, of course, Deputy Chairman of the Gas Council), to remark that oil was not the only good thing which came through pipes. There was another fuel suitable for central heating which was piped underground and went through a meter—he would say no more!

Earlier, in introducing the Parliamentary Secretary, Mr. Jones had explained that this exhibition was the third which the Federation had staged at Charing Cross by permission of London Transport. They were vain enough to hope that their previous exhibitions, in which they had tried to show what solid smokeless fuels could do, had helped to create an informed public opinion on the subject of clean air. It had been a great encouragement to know that the Beaver Committee had supported the policy which the Federation had had for many years—that a greatly increased use of smokeless fuel would be in the national interest.

Government Support

They had been further encouraged by the Government's adoption in principle of the policy for a reduction in the density of smoke in the atmosphere recommended by the Committee. Mr. Jones said that the Federation publicised the use of solid smokeless fuel by maintaining an advisory service, by exhibiting at appropriate exhibitions concerned with the building trades and fuel efficiency, and by maintaining a mobile exhibition which toured each summer in different parts of the country, visiting market towns and agricultural shows. Last summer the mobile exhibition had also supported the West Riding Domestic Smoke Campaign by setting up stands in the larger towns of the West Riding, and during January there had been an exhibit in Holborn, moving now to Woolwich. The exhibition at Charing Cross was perhaps the pinnacle of their year's work.

Also present at the opening ceremony were Sir Harold Smith, Chairman of the Gas Council, Sir Hubert Houldsworth, Chairman of the National Coal Board, Mr. R. Kelf-Cohen, of the Ministry of

Fuel and Power, the chairmen of ten gas boards, and representatives of the C.J.C., L.C.C., the British Coking Industry Association, and many other bodies. Particular importance was lent to the occasion by the presence of several members of the Government and a number of other M.P.s.

The exhibition itself is well up to standard and is educational and informative in character. A note of warmth and smokelessness is conveyed by an outsize brazier burning solid smokeless fuels which dominates the front of the exhibition. This focuses attention to a display of the solid smokeless fuels produced by the Federation in the range of sizes recommended for the various types of domestic appliances. Display panels give extracts from the Beaver Report and the cost of air pollution to the nation, and a plan for London is set out on a series of displays. This brings us to the main exhibit—six appliances alight and burning solid smokeless fuels. The display of appliances ranges from the domestic hot water boiler to the open fire, and differs from the previous exhibitions mainly in the exclusion of a free-standing heat storage cooker.

The exhibition is bright and attractive, and should do much to continue the good work of showing the public that the Federation's aims are for the good of everyone. The exhibition will remain open until February 19.

Midland Juniors Visit Jeavons Engineering Company's Works

Some 70 members of the Midland Junior Gas Association visited the works of the Jeavons Engineering Company (proprietors E. E. Jeavons & Co., Ltd.) at Tipton, Staffs, on January 20. It is worthy of record that the visit was the first of its kind arranged by the Company, which had not previously entertained either a Junior Association or any Section of the Institution of Gas Engineers. In a way, modest perhaps, the Midland Juniors and the Jeavons Engineering Company thus contributed towards the making of gas industry history.

The visitors were welcomed by the Company's Chairman and Managing Director, Mr. E. E. Jeavons, and the other Directors, and were entertained to lunch and tea. Mr. Jeavons said that the Board felt honoured by this visit during the Association's Jubilee session and he wished them success in the remainder of their programme. The visitors were then conducted around the works by the Director in charge, Mr. H. E. Shaw, and his technical staff, and they saw the following items in the various processes of manufacture: Gas pressure governors for mains, services, and appliances to suit high, intermediate, and low pressure systems; volumetric governors of all types for high and low pressure systems, either manually operated or for remote control; cut-off valves, fan failure valves, pressure relief valves, anti-suction valves, steel kiosks, and other ancillary equipment; 'Jevco' patent brass compression joints for light gauge copper tubes; socket clamps for gas mains; and welding and pipecutting by machinery.

The parent Company was founded in 1919 by the present Chairman and Managing Director, Mr. E. E. Jeavons, who was shortly joined by Mr. J. H. Kemp, Assistant Managing Director and Secretary. In the early days the chief activities were the laying of gas and water mains, but the business extended rapidly and took on the additional activities of civil engineering contracting and road surfacing.

The origin of the Jeavons Engineering Company section was the purchase of Gas Distribution, Ltd., in the early 1930's. This small concern had some manufacturing arrangements with American companies in the sphere of governors, with the result that high pressure service and district governors were subsequently produced for the British market. This led to the manufacture and development of a wide range of sizes and types of governors for mains, services, and appliances for high, intermediate, and low pressure systems. Mr. H. J. Reynolds, President of the Association, thanked Mr. E. E. Jeavons and the other Directors for their hospitality and for the interesting visit to the works. All concerned had been impressed with the layout, efficiency, and what is perhaps most important, the team spirit in every section.

Mr. E. E. Jeavons, Chairman and Managing Director of the Jeavons Engineering Company (left) with Mr. H. J. Reynolds, President of the Midland Junior Gas Association.

In the pipe cutting shop at the Jeavons Engineering Company's works.

Fuel Saved: Output Up

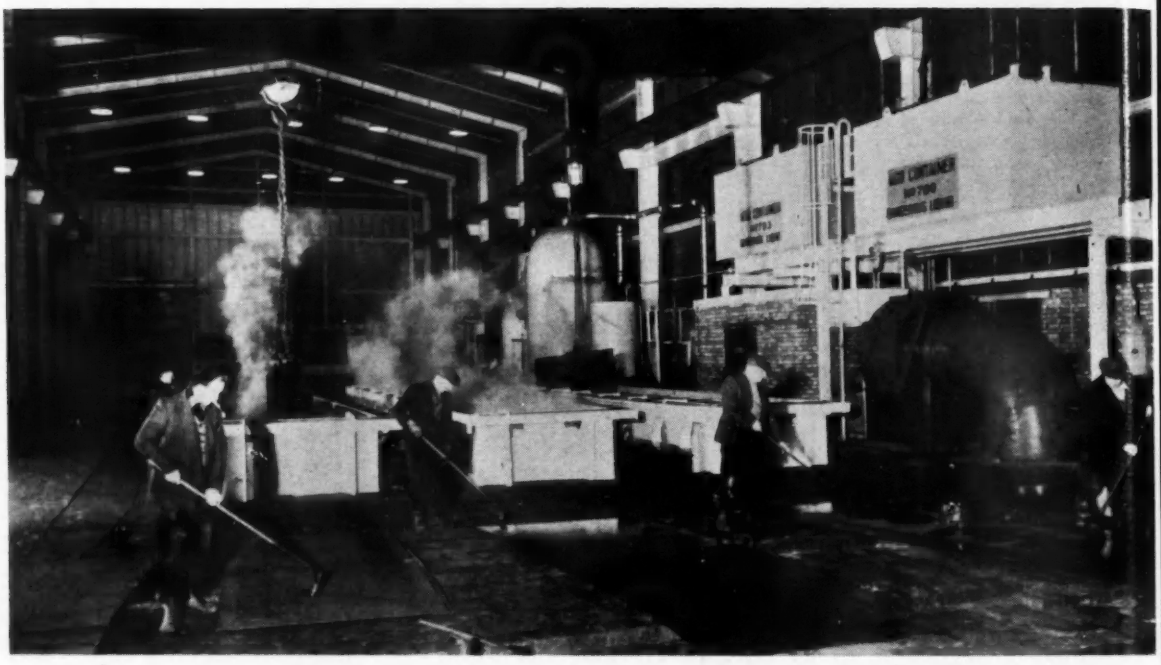
Some firms in the South West of England have reduced their fuel consumption by over 20% and increased their production, as a result of advice from the National Industrial Fuel Efficiency Service.

Mr. H. Kinsey, the Service's Area Engineer, recently addressed a meeting at Bridgwater of the North Somerset District Committee of the Regional Board for Industry. He quoted the Midsomer Norton firm of Dent, Allcroft & Co., Ltd., who had reduced consumption from seven-and-a-half to six tons per week.

Mr. Kinsey explained the services offered to industry by N.I.F.E.S., and said that the Government loan scheme under which loans of up to £30,000 are available for the replacement of out-of-date boiler plant had now been extended to non-industrial organizations.

WHESSOE'S NEW LARGE PICKLING SHOP

Completion of £1 mill. Works Reconstruction



Part of the new Whessoe pickling shop, showing in the foreground the painting area, and, behind, the pickling baths and steam-raising plant.

Whessoe, Ltd., Darlington, announce that they have recently put the first part of their new pickling and painting shop into operation. Pickling—the sulphuric/phosphoric acid (Footner) process for combating the corrosion of mild steel—has proved itself fully in the last 20 years. The demand for the initial protection of mild steel plates and sections used in plant for the oil, gas, chemical, and other heavy industries has been steadily growing so that the shop built in 1936 has become too small. The new shop completes the works reconstruction programme on which Whessoe have expended £1 mill. since 1946.

Since starting pickling in 1934 Whessoe have treated approximately half a million tons of steel plate and sections. At first one oil company was the sole user of pickled steel plates for storage tanks—one of Whessoe's chief products—but, as the process became known and its advantages as an anti-corrosive measure appreciated, its application has extended. Nowadays 80% of the total output of Whessoe is treated. Large tonnages of plate go to the oil industry, the gas industry increasingly favours its use for gasholders and purification plant, the chemical industry employs it for tanks and process vessels, and it is also used for wind tunnels and similar structures.

Whessoe pioneered the pickling of heavy mild steel plates and sections in Great Britain in 1934, a year after Pfeiffer described the process to the first World Petroleum Congress. The phosphoric acid process used then consisted of descaling in a hot 10-15% solution of phosphoric acid, followed by immersion in a 2% solution at 85°C. to form a thin film of corrosion-inhibiting iron phosphate on the surface of the steel. Though giving satisfactory results, the process was expensive and in an effort to reduce costs the regeneration of the spent solution with sulphuric acid was tried for a time.

Finally, in 1936, Whessoe began to use the sulphuric acid/phosphoric acid process, which proved as effective as both previous processes, and cheaper. It was the result of joint investigations by the Shell Petroleum Co. and Whessoe.

In this process millscale is removed in hot 5% sulphuric acid; the plate is then washed in hot water and finally immersed in 2% phosphoric acid at 85°C. The removal of millscale obviates the danger of accelerated corrosion and ensures that maximum life is obtained from the paint subsequently applied. The phosphoric acid bath gives a film of iron phosphate, which inhibits underpaint corrosion and provides an excellent key for paint.

Before the steel has time to cool appreciably, it is coated with good quality priming paint, which is brushed well into the hot phosphate filmed surface. The resultant priming coat will withstand rough handling during subsequent transportation and erection work and provides an excellent start for the final paint treatment.

The new shop is 400 ft. long by 62 ft. wide by 37 ft. high to the eaves. It is of all-welded rigid frame construction with brickwork cladding and wire cast glass glazing, the roof being of Asbestos Trafford tiles and the floor generally of concrete. The shop is served by four overhead travelling cranes, each of 7½ tons capacity.

The pickling baths, which are contained in an acid-resisting brick-lined pit, are of mild steel construction with an acid-resisting rubber lining protected from mechanical damage by a timber lining. These baths are of similar construction to those formerly used, but larger. The approximate dimensions are 33 ft. long by 5 ft. 9 in. wide by about 9 ft. 6 in. deep to take the larger plate sizes coming into use. Heating is by steam generated in a vertical tube oil-fired boiler fitted with automatic control. Both acid baths employ the 'push-pull' type of fume extraction plant. Adequate changing, washing and lavatory accommodation is available for the men employed in the shop. A small laboratory from which the process is controlled is included within the building.

A Joint Visit of the Manchester and North of England Sections of the Institution of Gas Engineers to the Tinsley Works of the North Eastern Gas Board on March 25 will coincide with the centenary of Robert Dempster & Sons, Ltd., of Elland. An invitation has been extended to the members to attend a celebration dinner at the Queens Hotel, Leeds.

BON VIVEUR IS TRES BON!

First of a New Series of Cookery Demonstrations Emphasized Audience-participation

ALL the slapstick and slick repartee normally associated with the sophistication of the West End comedy stage went into the first of a new series of cooking demonstrations sponsored by the Gas Council featuring Bon Viveur, the husband and wife team, John and Phyllis Craddock. This combination, internationally famous for books and newspaper articles on food and wine, wielded superb stagecraft to delight an audience of 2,000 at the Kursaal Ballroom, Southend-on-Sea, in the area of the North Thames Gas Board. They jostled and nagged each other just as two not-so-newly-weds would do when trying to work in the kitchen at the same time.

The Craddocks stepped on to the stage fully dressed for large-scale kitchen warfare; a dust-cap and starched apron for Phyllis and a chef's hat and overalls for John. But that, they said, was how it used to be in days when cooking was a distinctly sooty business. And so away went the outdated outfits to reveal a topless gown for the better half of Bon Viveur and tails for the lesser. 'Don't dress like this in *your* kitchen,' implored Phyllis, who, of course, did most of the talking that evening. Nevertheless, the fact that she did not once splash her glittering evening-dress, was a testimony to the convenience of all the modern equipment surrounding her on the stage.

Most popular event of the evening was—a fish frying demonstration. The bracing resort of Southend has several traditional tourist attractions, notably, its mile-long pier, its tooth-defying rock, its pleasure-park (the Kursaal) and its fish and chips. Bon Viveur showed their idea of how to cook whitebait, a fish that is in abundance along this coast.

She likes it! Mrs. Joan Robins has her verdict announced by a 20-years-old home service adviser. (John Craddock wore dark glasses because of eye-strain).

Verdict of a member of the audience: 'It tastes good.'

The rest of the recipes were simple, but, as the audience were called upon to testify, effective. Choux paste, for eclairs and cream buns, was made from flour, eggs and butter. Confectioners' custard was beaten and battered from flour, eggs, caster sugar, butter, salt and milk. Nothing, in other words, that the average housewife has got to do extra shopping for. The *pièce de résistance* appeared to be 'Soufflé Surprise,' and the audience, tantalized for the past hour by the sight of a succession of delicious dishes, nearly fought to try this. The ingredients? A block of ice cream, fruit, a slab of sponge, eggs and sugar.

Hundreds of applications for the Kursaal performance were turned down well before the event. There is no doubt that the audience were pleased with this first staging of the new venture, and provided Phyllis Craddock can keep up her tremendous vitality for as long as it takes the pair to tour the other 11 boards, 'Kitchen Magic' should be an unqualified success.

What is the secret of Bon Viveur's technique? Apart from personality and authority, what lifts this whole show away from in-the-rut cookery demonstrations, is the high degree of audience-participation.

The North Thames Gas Board, in conjunction with the Gas Council, started off well. Each member of the public was given a ticket for a prize-draw at the end of the show—no one went home early. The winner, a Southend housewife, was given a magnificent cake.

Another clever idea was the placing on each seat before the show of a folder advertising electric/gas washing machines and the new open-fire lighter. Also in the folder were Bon Viveur recipes.

After the successful completion of each recipe, home service advisers distributed the results among enthusiastic onlookers. More of the audience mounted the platform to taste a finished dish, and announce their verdict publicly.

The arrival on the stage in this way of Mr. David Woodall, of the South Eastern Gas Board, was purely coincidence, but a deliberately added touch of polish to the evening came when Mrs. Joan Robins mounted the platform.

Phyllis Craddock looks anxious as the youngsters help themselves.

TRADE NEWS

New quick-response radiation pyrometer

The new Cambridge quick-response radiation pyrometer or 'Féry' telescope has an exceptionally rapid response to radiated temperature, claim the makers. Used in conjunction with the Cambridge quick-acting recorder, or with the new Cambridge electronic recorder, it provides a simple and easily operated means of measuring temperatures rapidly where the conditions require the use of the radiation type of pyrometer. The pyrometer, which we

illustrate here, incorporates improvements in electrical and mechanical details.

Normally, the rate of response of the instrument is such that 99% of a radiation input corresponding to a full scale reading will be measured in 4.6 seconds, and 99.9% in 6.9 seconds. Where a still quicker response is required for exceptional applications at moderate temperatures, a specially fast receiver can be provided to give 99% full scale response in 1.2 seconds and 99.9% in 1.8 seconds.

A compensating device in the electrical circuit reduces the effect of change in ambient temperature (*e.g.*, about 1° low for 1° ambient rise at 1650°C. and 10 mV output). Provision is made for water cooling, however, to ensure accurate readings, and an alarm may be fitted to give warning of failure of the water supply.

The shortest normal distance of operation, measured from the front face of the instrument, is 3 ft., and the size of hot area must not be less than about 1¼ in. for every 3 ft. distance. This size is just sufficient to ensure that the image of the hot body when viewed through the telescope and properly focused will completely cover the aperture surrounding the sensitive element.

The instrument is very simple to use and to service. It is sighted upon the hot body by directing the telescope appropriately and viewing through the eyepiece at the rear. The front window is attached by magnets and may be changed in a few seconds, while the mechanical layout is so arranged that any attention required to the mirror or the radiation receiver can be done with minimum interruption of readings.—*Cambridge Instrument Co., Ltd., 13, Grosvenor Place, London, S.W.1.*

Pescara-Muntz free-piston compressors

Mackay Industrial Equipment, Ltd., announce that they have acquired from Alan Muntz & Co., Ltd., of Heston, Middlesex, an exclusive licence covering the manufacture and sale of Pescara-Muntz free-piston air compressors. The territory covered by the licence includes Great Britain, Eire, the Dominions, Colonies, Protectorates and Mandated Territories of the British Commonwealth of Nations (including India) and Egypt.

In July last Alan Muntz & Co., Ltd., appointed Mackay as sole concessionaires for the United Kingdom (excluding Scotland). The experience gained by Mackay with the P.42H portable compressor since then has confirmed their confidence in the potential of free-piston compressors and has led them to take this important and controlling interest in the manufacture and marketing of Pescara-Muntz free-piston compressors.

Under the terms of the agreement, the technical knowledge of free-piston engines acquired by Alan Muntz & Co., Ltd., during many years of active development work remains available to Mackay to assist with all technical matters and new developments.—*Mackay Industrial Equipment, Ltd., Faggs Road, Feltham, Middlesex.*

Magnetic wall charts

In the shift superintendent's office at the East Greenwich Works the South Eastern Gas Board recently installed one of the new 'Wondersign' magnetic wall charts.

It is used—throughout the 24 hours of the day—to record the schedules of pressures for transmission and district mains. At a glance the shift superintendent can tell the correct pressure to any particular district in the South East Metropolitan area. Previously a typed notice was used, but with frequent variations of pressure over the week, a simple means of altering the information was required.

The 'Wondersign' at East Greenwich is a framed wall chart, 3 ft. × 3 ft. 6 in., with permanent column lines—11 mains-supplied districts across the top and 51 time checks down. Numbered magnetic symbols are used in the appropriate columns.

'Wondersigns' characters are metallic and unbreakable. They have strong permanent magnets set into them, and upon contact with the metal chart, stay instantly and firmly. They are simply set up, neat and easily cleaned. On this particular board the figures are in black and red on white backgrounds, but many different 'Wondersigns' are available for other applications, including production charts, maintenance, personnel control, plant location and transport. As well as a complete range of cut-out letters and figures for general notices, the makers have a collection of symbols on the market, such as ships, circles and rectangles, all of which can be written on. Maps or diagrams can be mounted on metal for plotting and models can be magnetized for showing plant layout.—*Acme Showcard & Sign Co., Ltd., 9, South Molton Street, London, W.1.*

The Bosch gas igniter

In the January 5 issue of the 'GAS JOURNAL' we published an article entitled: 'Summer Warmth in Winter' referring to gas overhead heaters manufactured by Radiant Heating, Ltd. Of the ignition we said 'For single, or possibly two, heaters, the flash ignition comprises a magneto type flasher, which does not require electrical connections. The magneto flasher is connected to the sparking plug by means of standard H.T. cable.'

This means of ignition is the Bosch gas igniter, for which the sole representatives in the United Kingdom are Tekon, Ltd.

The Bosch gas igniter is a new and self-contained device specially designed to be built-in to gas appliances and apparatus to ignite gas at up to three spark-gaps in series by press-button operation. Neither flint nor battery nor electrical supply is needed and there is nothing to wear out. Wiring may be by conventional high tension cable or, preferably, by bare steel wire of 10 to 12 s.w.g., held by insulators at ½ to ¾ in. from bare metal. Spark-gaps are normally formed between ends of heavy gauge steel wire or from end of wire to burner.

In special cases, where the gas apparatus lends itself to this, ordinary sparking plugs may be used; Bosch plugs are also available from Tekon, Ltd.

The self-generated high tension impulse passes readily through vitreous enamel. No interference is caused to television reception. It is claimed that the igniter is particularly suitable for igniting all flammable gases at points difficult of access, as well as for building in to more

Concluded on page 398

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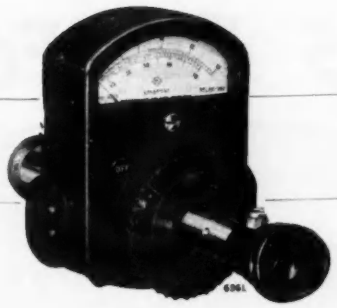

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Can be conveniently and rapidly measured by the CAMBRIDGE DISAPPEARING FILAMENT PYROMETER. It is supplied as standard equipment by some of the largest retort constructors in this country and is used by hundreds of gas engineers.

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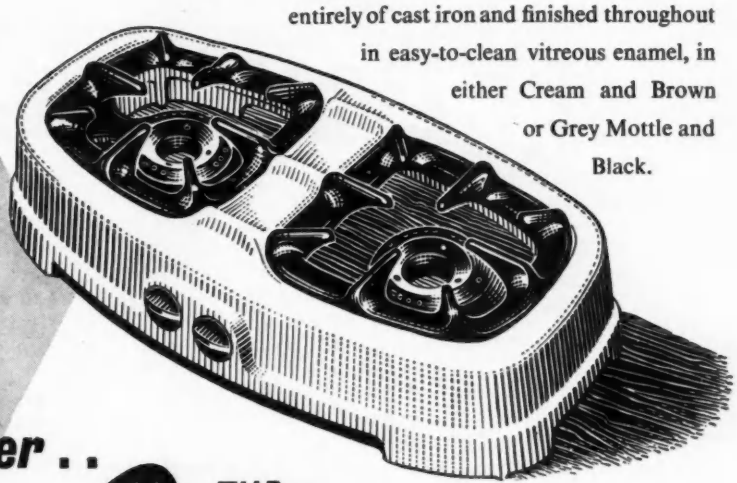
13 GROSVENOR PLACE LONDON SW1

For the office . .

the flat . .

or the one-roomer . .

This attractive hotplate has two boiling burners controlled by separate taps. Constructed entirely of cast iron and finished throughout in easy-to-clean vitreous enamel, in either Cream and Brown or Grey Mottle and Black.



THE *Duette* HOT PLATE

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Makers of fine quality cooking & heating appliances since 1777.

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FAULTLESS PERFORMANCE

FLAWLESS APPEARANCE...

As the skating star's faultless performance and flawless appearance delight her critical audience, so the faultless performance and flawless appearance of the Century Cooker delight the critical housewife . . . as the star's perfect skating is the result of years of training and practice, so the Century is the result of R. & A. Main's years of experiment and research.

Always to the forefront in improving the efficiency of the gas cooker, R. & A. Main Ltd. have been "first in the field" with many outstanding features . . . in 1922 Main introduced the simplified form of cooker construction . . . in 1927 Main were first with an all-enamelled cooker . . . and in 1935 Main introduced the first all-sheet metal cooker.

The No. 20 Cooker was the first chassis-less model to be produced and marketed in Britain, and it was also the first cooker to incorporate an oven-flue vent discharging in front of the backplate. The high efficiency and popularity of the Century has indeed proved the worth of Main's years of constant research.

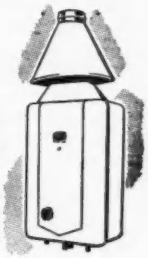
MAIN No. 20 CENTURY GAS COOKER

C3

Note the name-made by MAIN

R. & A. MAIN LIMITED
LONDON and FALKIRK

there is a MAIN water heater for every domestic purpose . . .



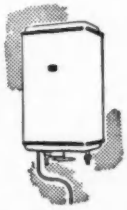
instantaneous for a complete household service . . . the M.I. Multipoint

instantaneous for the bath . . . the New Junior

instantaneous or storage

for a complete household service . . . the G.L.C. Circulator

storage for a complete household service . . . the Thermain No. 15



storage for the sink or lavatory basin . . . the Thermain No. 2

MAIN WATER HEATERS Ltd.

Gothic Works, Thornton Rd., Croydon Surrey
W13

TRADE NEWS: *From page 394*

conventional gas appliances, as, for example, cookers.

Concerning our feature which contained mention of this igniter, Tekon, Ltd., inform us: 'Because flash ignition is normally associated only with flash-tubes, the terms "flash ignition" and "magneto type flasher" may be misleading. The device is a magneto—not a magneto type—specially designed as a gas igniter.—*Tekon, Ltd., 50, Baker Street, London, W.1.*

Standardization of motor sizes

A step forward in the establishment of standardization in the basic dimensions and outputs of electric motors has been taken by Lancashire Dynamo & Crypto, Ltd. This has been brought about by the Company's introduction of a new Anglo-American range of protected type and T.E. Fan-Cooled 50 cycle 3 phase motors in the 1 to 30 h.p. range—a direct answer to the American action in revising their dimensions and ratings.

The Lancashire Dynamo range, both protected and T.E. Fan-Cooled, has been so designed that the motors are suitable for use in this country on 50 cycle 3 phase and yet have common outputs and fixing dimensions, not only with each other, but also with 60 cycle motors of the same type in the American new 'N.E.M.A.' and Canadian new 'C.E.M.A.' ranges.—*Lancashire Dynamo & Crypto, Ltd., St. Stephen's House, Victoria Embankment, London, S.W.1.*

'Allweather' paints

'Pitan' cold temperature resistant paint is one of two new products being marketed by Allweather Paints, Ltd. This paint can withstand temperatures of as low as −60° and yet remain flexible, say the makers. It incorporates a special cold temperature resistant plasticizer and provides a surface which will withstand acid and alkali attack and the destructive effects of brine and ammonia.

The other new product developed by this firm is a chlorinated rubber based mould resistant paint. This was achieved by incorporating a fungicide which will not cause embrittlement or other deterioration of the paint film. The main constituent is mercury, which is well known for its fungicidal properties in protective paints. This mercury is permanent and insoluble in water.

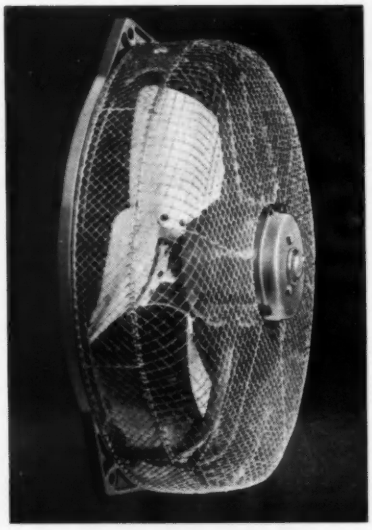
The firm emphasize that, unlike linseed and vegetable oils, chlorinated-rubber has no nutritive value for those fungi which fatten on oils. Chlorinated rubber paints, they say, provide a relatively impermeable paint film, which is another advantage since it has been shown that the presence of moisture in a paint film attracts mould formation.

However, the paint film must not be too impermeable otherwise the toxic mercury compound cannot act. Allweather's research laboratories have succeeded in opening the chlorinated rubber film sufficiently for the poisons to be effective, but not enough appreciably to affect the impermeability of the film. The fungicide in the final film is non-toxic except to fungi.—*Allweather Paints, Ltd., 36, Great Queen Street, London, W.C.2.*

Safety-first fan guard

In recent experiments carried out by Keith Blackman, Ltd., it has been found possible to produce a simple and highly effective propeller fan guard which complies with the all-important safety factor, offers no great restrictions to air flow and does not create additional air noise. This design of guard is now fitted as standard to Keith Blackman's new range of 'APA' type fans.

In this type of guard, the 'vulnerable' zone is now formed cylindrically and protected by a much closer wire mesh. The photograph illustrates the guard's construction and indicates the im-



possibility of making accidental contact from either the peripheral or previously referred to 'vulnerable' zone.

In the design of all 'APA' fans, special fixing plates are incorporated with the fan ring so that this new guard may be fitted, quite simply, whether ordered at the same time as the fan or at a later date.—*Keith Blackman, Ltd., Mill Mead Road, Tottenham, London.*

Revolving refractory chart

The makers of Ciment Fondu aluminous cement have produced a revolving refractory chart which shows at a glance the various uses for refractory concrete, the most suitable aggregates, suggested mixes and also the hot face temperatures which such mixtures should withstand.

This ingenious device should prove popular among those interested in foundations, heat resistant floors, fireproof walls, coke oven and furnace doors, firebox linings, brick settings, chimney linings, boiler settings, ash pits, coke coolers and flues.—*Lafarge Aluminous Cement Co., Ltd., 73, Brook Street, London, W.1.*

Diary

Feb. 11.—SCOTTISH JUNIORS (WESTERN): 'Ubique,' F. D. Southwell. 522, Sauchiehall Street, Glasgow, C.2, 6 p.m.

Feb. 12.—SCOTTISH JUNIORS (EASTERN): Meeting at Falkirk.

Feb. 14.—PURCHASING OFFICERS' ASSOCIATION (LONDON BRANCH): "Some Aspects of the Modern Law of Contract,' J. S. Barnes, Solicitor, North Thames Gas Board.

Feb. 14.—WALES AND MON. JUNIORS (SOUTH): Visit to Smith Crisps, Ltd. 'Planning for Thermal Efficiency,' K. H. Langford.

Feb. 15.—LONDON AND SOUTHERN SECTION, I.G.E. 'Development of By-Products Works at Tottenham,' H. Wadsworth. 17, Grosvenor Crescent, London, S.W.1, 2.40 p.m.

Feb. 16.—LONDON JUNIORS: Visit to R. & A. Main, Edmonton.

Feb. 17. EASTERN SECTION I.G.E.: 'Technical Problems in the Utilization of Town Gas in Industry,' F. Dickenson and F. Johnson: 17, Grosvenor Crescent, S.W.1, 2.15 p.m.

Feb. 17. WALES AND MON. JUNIORS (SOUTH): Visit to Refrigeration Factory. 'Planning for Thermal Efficiency,' K. H. Langford.

Feb. 17 and 24.—MIDLAND JUNIORS. Visit to Audley Engineering Co., Ltd., Newport, Salop.

Feb. 18.—MIDLAND SECTION, I.G.E.: 'The West Midlands Approach to the Gasification of Residual Oil' (I.G.E., Comm. 456), G. le B. Diamond. Queen's Hotel, Birmingham, 2.30 p.m.

Feb. 18.—MANCHESTER SECTION, I.G.E., and NORTH WESTERN SECTION, INSTITUTE OF FUEL: Joint meeting on 'Sulphur Removal and Recovery,' Engineers' Club, Albert Square, Manchester, 2.15 p.m.

Feb. 21. EASTERN G.C.C.: Connaught Rooms, Great Queen Street, Kingsway, W.C.2. 2 p.m.

Feb. 23. WESTERN JUNIORS: Visit to works and stores of Metal Agencies Co., Ltd., Bristol.

Feb. 24.—NORTH OF ENGLAND SECTION, I.G.E.: 'The First Years in the Life of a New I.V.C. Installation,' H. Waiton. Demonstration Theatre, Grainger Street, Newcastle-upon-Tyne.

March 1.—EAST MIDLANDS G.C.C.: Victoria Station Hotel, Nottingham, 11.30 a.m.

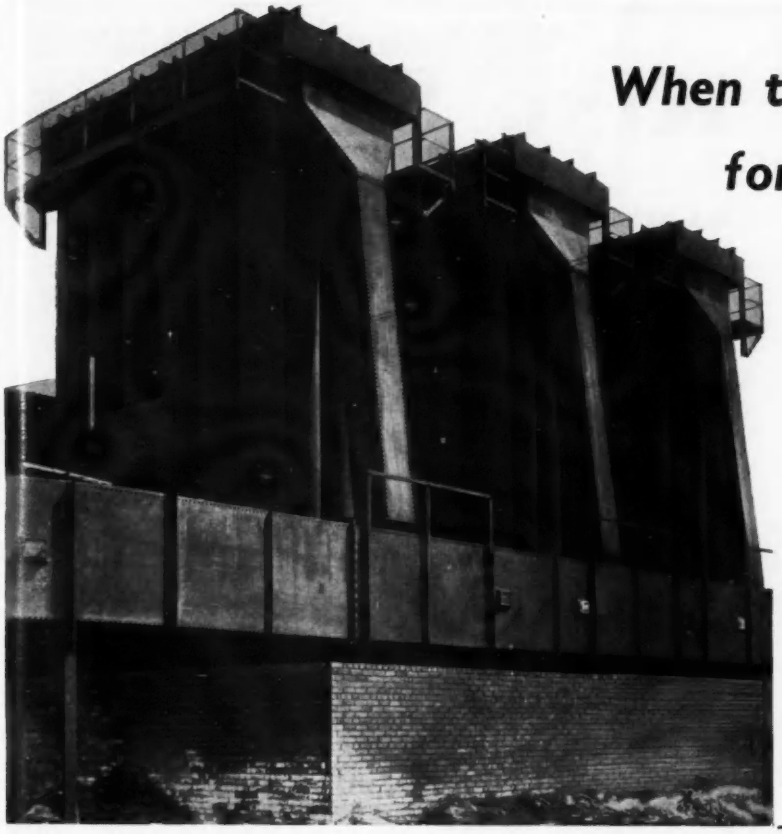
March 2.—SOUTHERN G.C.C.: Reading.

March 2.—SOUTH WESTERN G.C.C.: 34, Bridge Street, Taunton, 11 a.m.

March 5.—MANCHESTER JUNIORS: Visit to Partington works.

March 5.—SCOTTISH JUNIORS JOINT MEETING OF WESTERN AND EASTERN DISTRICTS: Address by H. F. H. Jones, M.B.E., Deputy Chairman, Gas Council. Glasgow, 3 p.m.

March 8.—MIDLAND JUNIORS: 'Gas Quality Measurement,' H. Mellors. Birmingham.



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GAS JOURNAL. *(Weekly.* Wednesday, By Post, **1s. 5d.)**

The "Gas Journal" has existed as an integral part of the Gas Industry since 1849. Unbiased policy, technical knowledge, accuracy and reliability combine with an extensive news service and modern make-up to make the Journal the leading Gas Industry newspaper.

Annual Subscription (including a copy of the "Gas Journal" Calendar and Directory): Home and Empire, **52s.** ; Foreign, **60s.**

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"Gas Service" is the specialist magazine for the Sales and Service personnel of the Industry. It covers all aspects of gas service from the holder to the burner. In addition to sound editorials, news items and specially contributed articles, "Gas Service" also reports in the fullest possible manner the activities of the numerous Salesmen's Circles.

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In addition to permanently binding subscribers' journals, (particulars and prices for which we shall be pleased to give on application) we can supply TEMPORARY BINDERS for the Gas Journal, Gas Service and King's Manual of Gas Manufacture, thus enabling readers to *bind their copies as received.* The danger of mislaid or damaged copies is eliminated.

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Manufacturers of Best Staffordshire Blue, Brown and Red Engineering Bricks
Blue pressed and Wirecut Paviors for Hopper Linings and Retort House Floors

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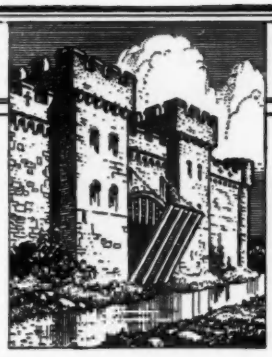
See our Advertisement Next Week.
REAVELL & CO. LTD. IPSWICH.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Quarterly Volumes of the 'Gas Journal'
7/6 each, post free
Walter King, Ltd., 11, Bolt Court, Fleet Street, London, E.C.4.

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price **1/3d.**; by post **1/5d.**

Subscription Rates: Home and Empire:—**52/-** per annum; Foreign:—**60/-** per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at **1/9** per line (approx. **7** words)—minimum charge **10/6**. A Box Number address occupies **2** lines, and a further **6d.** is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received **14** days prior to publication if proofs are required. Type area of inside pages **10** in. deep × **7** in. wide; block screen **120**.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS MANAGER: G. B. Torrance, 42, Wychall Lane, King's Norton, Birmingham, 30. *Telephone:* Kings Norton 3868
NORTHERN MANAGER: Philip W. B. King, Flat 1, 7 Langcliffe Avenue, Harrogate. *Telephone:* Harrogate 67625.
SOUTHERN REPRESENTATIVE: A. Engelhardt, 11, Bolt Court, Fleet Street, E.C.4. *Telephone:* Central 2236-7

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DUTCH AND DANISH BOG ORE SPECIALLY ACTIVATED OXIDE OF IRON
Oxide supplied on loan or sale outright.
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ESTABLISHED 1873
PALMERSTON HOUSE, BISHOPSGATE, LONDON, E.C.2.
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THE COOKER CLEANER
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FIBRE BRUSHES
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KETTLE DESCALER
For resale to the public, and in bulk for works use.
BALE & CHURCH, LTD.
7, CROMPTON WAY, CRAWLEY, SUSSEX

PLANT FOR SALE

ONE 400 lbs. per hour (from and at 212° F) gas fired steam BOILER, hand control, newly retubed £65 0s. 0d.
Boiler is prepared for automatic control.
Apply: No. 227, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18–64 inclusive or a woman aged 18–59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

DRUMMOND PATENTS LTD., of 5, Great Winchester Street, London, E.C.2, have a vacancy for two young DRAUGHTSMEN with practical working experience behind them. The work they would learn and undertake is in a specialised field with progressive opportunity. Commencing salary according to experience. Enquiries will receive a courteous response.

(*Classified advertisements continued on page* 402)

APPOINTMENTS VACANT (ctd.)

EAST MIDLANDS GAS BOARD

SHEFFIELD & ROTHERHAM DIVISION
ASSISTANT ENGINEERS

APPLICATIONS are invited from suitably qualified persons for vacancies which will shortly arise for Assistant Engineers at the Neepsend Works, Sheffield and Car House Works, Rotherham. The salaries will be within grades A.P.T. 8/9 and A.P.T. 10/11 (£625/755 and £715/865 respectively).

The duties of the posts entail responsibility for the operation, under the control of the Works Engineer, of large carbonising, C.W.G., and ancillary plant installations.

Candidates, who must hold the Higher Grade Certificate (Manufacture) of the Institution of Gas Engineers, should have had experience in operation of plants of the above types and preferably have had some experience in the control of labour.

The positions are pensionable and the successful applicants will be required to pass a medical examination.

Applications, giving details of age, education and experience, together with the names and addresses of two referees, should be addressed to reach the undersigned not later than February 28, 1955.

C. C. WOOD,
Divisional General Manager.

Commercial Street,
Sheffield.
February 4, 1955.

EAST MIDLANDS GAS BOARD

SHEFFIELD & ROTHERHAM DIVISION
DISTRICT DISTRIBUTION ENGINEER

APPLICATIONS are invited for the position of Distribution Engineer of No. 7 District with Headquarters at Matlock. This district consists of a group of Undertakings including Matlock, Hathersage, Tideswell, etc.

Applicants should have had considerable practical experience of mains and service laying and have knowledge of distribution planning. They should be Corporate Members of the Institution of Gas Engineers or alternatively possess an equivalent technical qualification.

The salary will be in accordance with Grades A.P.T. 6 or 7 of the National Salary Scales for Gas Staffs up to a maximum of £665 per annum and the initial placing will be dependent upon the qualifications, experience and ability of the applicant.

It is anticipated that living accommodation will become available at a reasonable rental.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications stating age, qualifications, and giving details of experience, together with the names of two referees, should be addressed to reach the undersigned not later than February 28, 1955.

C. C. WOOD,
Divisional General Manager.

Gas Offices,
Commercial Street,
Sheffield, 1.
February 4, 1955.

A GAS CONTROL ENGINEER is required for the distribution of Natural Gas in WEST PAKISTAN. Previous experience in this field is preferred but not essential, but candidates should have considerable experience of gas distribution and be Corporate Members of the Institution of Gas Engineers or equivalent. Salary according to qualifications and experience but will not be less than Rs.(Pak.)1,500 per month (approx. £161 Stg.) with free board and accommodation. Applications with full details should be made in writing to Box G.J.857, *c/o* 191, Gresham House, E.C.2.

AN INSTRUMENT ENGINEER is required in connection with the distribution of Natural Gas in WEST PAKISTAN. Previous experience in this field is desirable but not essential. Candidates should be capable of supervising the maintenance of all metering and regulating stations, and the repair of meters and regulators. Salary according to qualifications and experience but will not be less than Rs.(Pak.)1,500 per month (approx. £161 Stg.) with free board and accommodation. Applications with full details should be made in writing to Box G.J.856, *c/o* 191, Gresham House, E.C.2.

WEST MIDLANDS GAS BOARD

BIRMINGHAM DIVISION
DEPUTY WORKS ENGINEER—
SOLIHULL DISTRICT

CANDIDATES must be Corporate Members of the Institution of Gas Engineers and should have had experience in the operation and control of continuous vertical carbonising, C.W.G. manufacture, and all ancillary processes. The Works is medium-sized with a present annual capacity of 600 million cubic feet, shortly to be extended to 900 million cubic feet.

The salary will be within Grade 9 (£655-£755 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, together with the names of two referees, should be addressed to Mr. J. E. Wakeford, Divisional General Manager, West Midlands Gas Board, Birmingham and District Division, Gas Offices, Edmund Street, Birmingham, 3, to reach him within fifteen days of the appearance of this advertisement.

J. C. INGRAM,
Secretary to the Board.

GRADUATE IN CHEMICAL OR FUEL ENGINEERING, age 30-35 with practical experience preferably of industrial gasification plants.

Applicants should have the outlook and ability to undertake an increasing measure of responsibility in the development and construction of coal gasification plants, after gaining specialised experience on existing and new plants in U.K. during the first year or two of employment.

A working knowledge of German is desirable. Good starting salary and excellent prospects. Headquarters near Birmingham. Full particulars to No. 226, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

SCOTTISH GAS BOARD

SOUTH EAST DIVISION
HAWICK SUB GROUP
TECHNICAL ASSISTANT

APPLICATIONS are invited for the post of TECHNICAL ASSISTANT, Hawick Sub Group. Sound practical training on either the Works or District essential and drawing office experience would be an advantage.

The salary will be Provincial 'A', Grade 3/5, *i.e.*, £335-£580. Full particulars of past experience and education should be submitted along with the names of two referees.

The post is pensionable and the successful applicant will be required to pass a medical examination.

Applications should reach the undersigned within ten days of the appearance of this advertisement.

ROBERT COWIE,
Sub Group Manager.

Gas Works,
Mansfield Road,
Hawick.

SCOTTISH GAS BOARD

LANARKSHIRE DIVISION
MOTHERWELL DISTRICT
ENGINEERING DRAUGHTSMAN

APPLICATIONS are invited for the appointment of ENGINEERING DRAUGHTSMAN (Salary within Grade A.P.T. 4—£335-£525), at Motherwell Gas Works.

Candidates should have practical experience in the Construction and Installation of Gas Works Plant, and qualifications in Mechanical Engineering will be an advantage.

Applications stating age, education, qualifications, training, present appointment and salary, should be lodged with the undersigned not later than Friday, February 18, 1955.

JAMES M. DOW,
Divisional Controller.

Divisional Offices,
Bothwell Road,
Uddingston,
Lanarkshire.
January 24, 1955.

SCOTTISH GAS BOARD

GLASGOW DIVISION
GLASGOW DISTRICT

APPLICATIONS are invited from suitably qualified persons for the post of
SENIOR TECHNICAL ASSISTANT (CHEMICAL)
AT PROVAN GAS WORKS GLASGOW

This post is graded within the Scale Provincial 'A' Grade A.P.T. VIII (£625-£705) and candidates should be fully experienced in the operation and control of gas production in large scale C.W.G. installations, all ancillary processes and should be conversant with all routine gasworks tests.

Appointment to this post, which is superannuable, will be in accordance with experience and educational qualifications.

The successful candidate may be required to pass a medical examination.

Applications, stating age, education and experience, along with the names of two referees, should be in the hands of the undersigned not later than Saturday, February 26, 1955.

D. F. YOUNG, Divisional Controller

30, John Street, Glasgow C.1.
February 3, 1955

WALES GAS BOARD

WREXHAM UNDERTAKING
JUNIOR TECHNICAL ASSISTANT—
DISTRIBUTION

APPLICATIONS are invited from suitable young men between the ages of 20/25 for a position as JUNIOR TECHNICAL ASSISTANT.

Applicants should have had training and previous experience in gas distribution and some drawing office experience, and should hold as a minimum, the Ordinary National Certificate in Mechanical Engineering or an equivalent qualification.

The commencing salary will be within A.P.T. 2, Provincial 'A', according to qualifications and experience.

The successful candidate may be required to pass a medical examination and if eligible to subscribe to the Board's Staff Pension Scheme.

Applications, stating age, education, qualifications and experience, with the names of two referees, shall be forwarded to J. F. Lloyd, Engineer and Manager, Wales Gas Board, Wrexham Undertaking, 23, Salop Road, Wrexham, not later than February 21, 1955.

EASTERN GAS BOARD

WATFORD DIVISION
VACANCY FOR
CARBONISING FOREMAN,
LUTON WORKS

APPLICATIONS are invited for the position of CARBONISING FOREMAN at the Luton Gas Works. Applicants, preferably under forty years of age, should have experience in the control, operation and maintenance of horizontal and continuous vertical retorts.

The salary offered is within the range of Grade A.P.T. 5 (£520-£600), Metropolitan Fringe grading, with placing according to qualifications and experience, and all conditions of service are in accordance with agreements of the National and Area Joint Councils for Gas Staffs. A house will be available at a reasonable rental for the successful applicant.

The person appointed may be required to pass a Medical Examination and, unless already subject to a Pension Scheme by virtue of the Gas (Pension Rights) Regulations 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications giving personal details and particulars of training and experience should be forwarded to the Works Engineer, Eastern Gas Board (Watford Division), Gas Works, Dunstable Road, Luton, Beds., not later than February 26, 1955.

NORTH EASTERN GAS BOARD

ENGINEERING ASSISTANT

APPLICATIONS are invited from suitably qualified persons for the position of ENGINEERING ASSISTANT in the gasholder section of the Chief Engineer's Office at the Head Office of the Board. Salary will be within Grade A.P.T. 9 (Provincial 'A') (£655-£755 per annum) of the Salary Scales agreed by the National Joint Council for Gas Staffs.

The duties involve the carrying out of inspections and making recommendations for the maintenance and repair of gasholders in the Area, the preparation of specifications, together with the supervision of work in progress and the carrying out of any drawing office work which may be required.

Candidates must have had good mechanical and structural drawing office experience. Preference will be given to candidates of Higher National Certificate standard.

The successful applicant will be required to pass a medical examination and to participate in the Board's Staff Pension Scheme.

Application forms may be obtained from the Chief Engineer, North Eastern Gas Board, Head Office, Bridge Street, Leeds, 2, and should be returned to him not later than February 28, 1955.

J. C. GARDNER,
Secretary.

Bridge Street,
Leeds, 2.

NORTH WESTERN GAS BOARD

APPLICATIONS are invited from suitably qualified persons for the following pensionable appointments :—

CENTRAL LANCASHIRE GROUP
SENIOR TECHNICAL ASSISTANT—
MOOR LANE WORKS, BOLTON

(*Salary within Grade A.P.T. 9—£655/755 per annum*)
The successful applicant will be responsible to the Station Engineer for technical control of a large works now in the final stages of reconstruction.

DRAUGHTSMAN AND
TECHNICAL ASSISTANT—
BURY WORKS

(*Salary within Grade A.P.T. 7—£585/665 per annum*)
The successful applicant will be responsible for the design and construction of new plant and buildings, and for the maintenance of existing plant, etc.

TECHNICAL ASSISTANT—BURY WORKS

(*Salary within Grade A.P.T. 5—£500/580 per annum*)
The successful applicant will be responsible for all routine tests and chemical control of plant.

Detailed applications giving the names of two referees should reach the General Manager, N.W.G.B. (Central Lancashire Group), Gas Offices, Dane Street, Rochdale, within ten days.

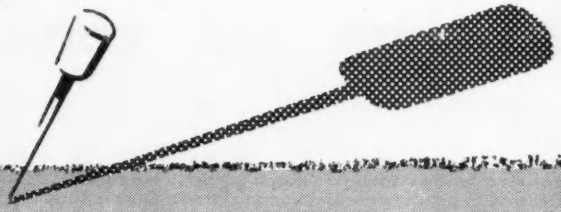
MANCHESTER GROUP
SHIFT ENGINEER—
BRADFORD ROAD WORKS, MANCHESTER

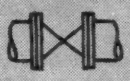
(*Salary within Grade A.P.T. 10—£715/815 per annum*)
Applicants should have practical knowledge of the operation and maintenance of Horizontal and Vertical Retorts, C.W.G. plants and be capable of supervising general gas works plant operation.

FOREMAN ELECTRICIAN—
SALFORD WORKS

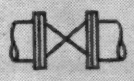
(*Salary within Grade A.P.T. 6—£530/610 per annum*)
Applicants must have experience of the maintenance of L.T. and H.T. electric motors and switchgear and be capable of organising routine electrical maintenance for gas works.

Detailed applications, giving names of two referees, should reach the General Manager, N.W.G.B. (Manchester Group), Town Hall, Manchester, 2, within fourteen days.

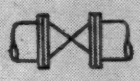




A redesigned Western Valve is coming into production April 1955



A valve made for engineers



Designed by engineers

FOUNDED 1850 HOLMES HUDDERSFIELD

W. C. HOLMES & CO. LTD.

HUDDERSFIELD · LONDON · BIRMINGHAM

C4536

industrial gas compressors

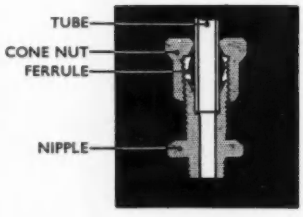
FOR COMPRESSING AIR OR GAS SUPPLIES USED FOR FURNACE HEATING, METAL MELTING, BRAZING, SOLDERING BITS, LAUNDRY IRONS, ETC.

DIRECT COUPLED COMPRESSORS (see *illustration right*) *are fitted with automatic internal by-pass valves and lubrication systems. They are direct coupled to Keith Blackman motors. Type OA compressors in this range occupy a floor space of only 18" x 7¼".*
CAPACITY RANGE: *100 to 750 cub. ft. of gas or air per hour at 3 lbs. per sq. in. pressure.*

TYPE 4 COMPRESSORS (*not illustrated*) *are also fitted with automatic internal by-pass valves and lubricators. The complete unit includes motor and drive on a common bedplate, all of Keith Blackman manufacture.*
CAPACITY RANGE: *500 to 20,000 cub. ft. of gas or air per hour at 3-5 lbs. per sq. in. pressure.*
AREA OCCUPIED: *from 9¼" x 16½" to 61" x 27".*

DID YOU KNOW?

KEITH BLACKMAN have been making compression joints for many years and the present design embodies features developed as a result of this long experience. *Notice that the shape of the ferrule is such that the joint is made without unduly stressing the tube.*



serving to burn

Note: the four burner heads (right) are for high pressure gas, or low pressure gas and air blast.

LEFT: "Fishtail" type burner *with two-armed stamped pattern injector for heating liquid in tanks by submerged combustion tubes. For use with low pressure gas supplies.*
Size Range: *1", 1¼", 1½", 2" and 2½" outlets.*
Capacity Range: *45-280 cub. ft. of gas per hour.*

Brass non-blow-off head types: *deal with 5 to 10 cub. ft. of gas per hour.*

Stainless steel, "F" type head, burner: *deals with 8 cub. ft. of gas per hour.*

Perforated head type burner: *deals with 10 to 15 cub. ft. of gas per hour.*

INDUSTRIAL GAS EQUIPMENT

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One of two Carbon-Ring, Oil-less Air Compressors, installed in conjunction with a 15,000 kilowatt gas turbine, by John Brown, Clydebank, at the Carolina Port Power Station, Dundee, for the North of Scotland Hydro-Electric Board. (Photograph by courtesy of the North Scotland Hydro-Electric Board).

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